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City of Mesa

SE Arterials Drainage Study

Project No. 01-698-001

Prepared for:

City of Mesa
Engineering Design
20 East Main Street, Fifth Floor
Mesa, Arizona 85211-1466

Registered Professional Engineer (Civil)
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Project No. 01-698-001

November 24, 2003

Premier Project No. 2002027

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1 INTRODUCTION

1.1 Background and Scope

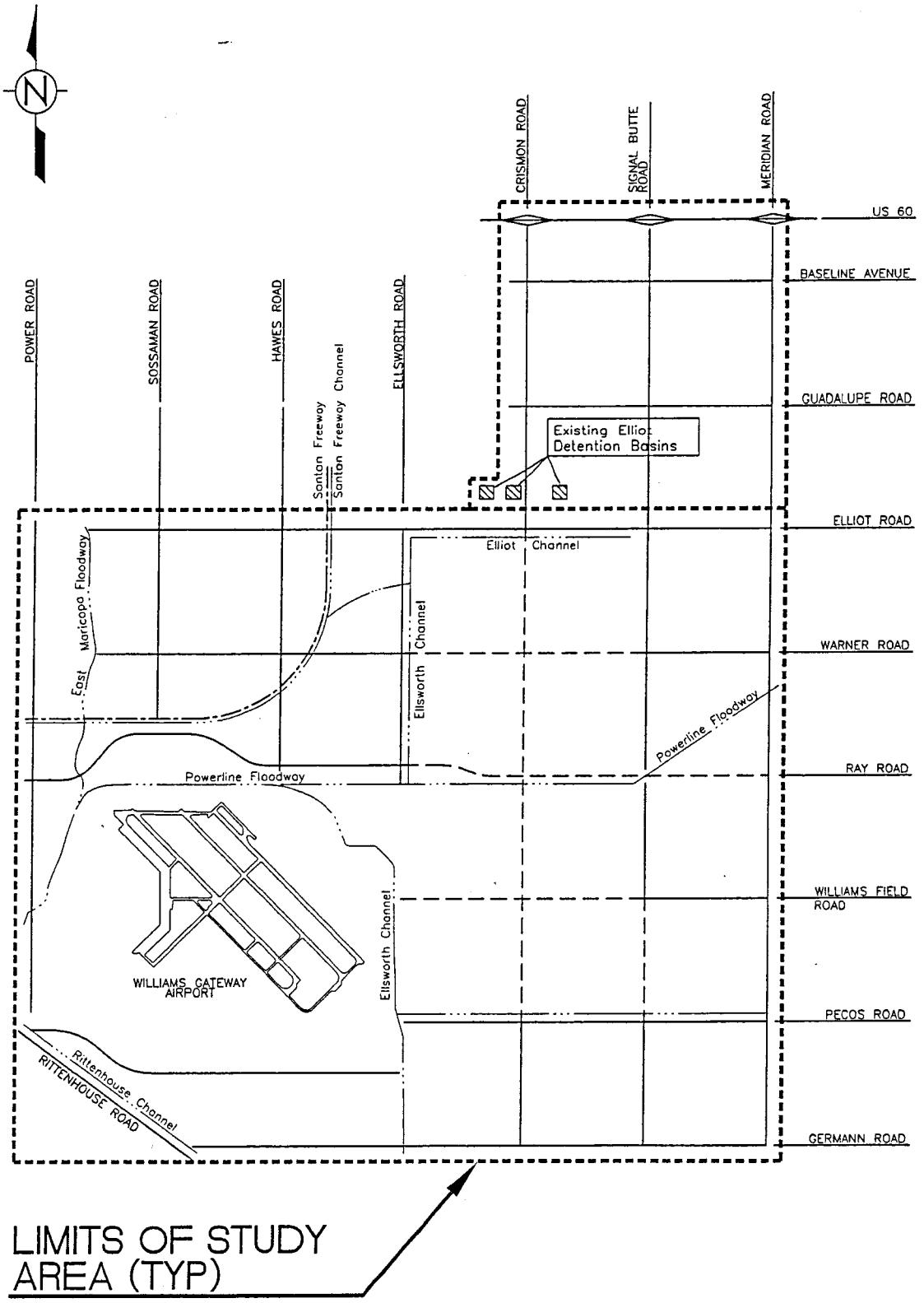
The City of Mesa has retained Premier Engineering Corporation (Premier) to prepare an arterial street storm drain master plan for the southeast portion of the city. The goal of the master planning effort is to develop the basic configuration of the storm drain system, to identify feasible storm drain outfall locations and to determine the preliminary sizes for storm drain mains along arterial street alignments. This data will be used by the City of Mesa in planning storm drainage projects as development takes place in the future.

The study area is bounded by Elliot Road to the north, Germann Road to the south, Power Road to the west and Meridian Road to the east (see Figure 1). Figure 2 indicates the Land Use Plan within the study area. Within this area, the storm water runoff from the arterial streets has been estimated for a 10-year event in accordance with Section 6 of the City of Mesa Engineering and Design Standards. It is assumed runoff would come from a 130-foot wide right of way with both six lane or four lane streets. In accordance with the City of Mesa Design Guidelines, the final design of the arterial street storm drains, lateral sizes and catch basin sizes and locations should be designed to provide capacity sufficient to limit the runoff spread to one (1) lane for the 10-year event. This design will require a detailed study with additional topography and is not included in the scope of this report. Offsite properties will be required to provide retention for storm-water runoff in accordance with City of Mesa development standards; therefore runoff from these tracts is not included.

Premier has obtained and reviewed existing drainage studies relevant to the study area. These reports included studies by the Flood Control District of Maricopa County, Arizona Department of Transportation and City of Mesa. Premier performed hydrologic analyses to determine the runoff generated within the arterial street right of way using the Rational Method in accordance with the City of Mesa "Procedure Manual, Engineering & Design Standards, Section 6, Drainage".

1.2 Previous Reports and Studies

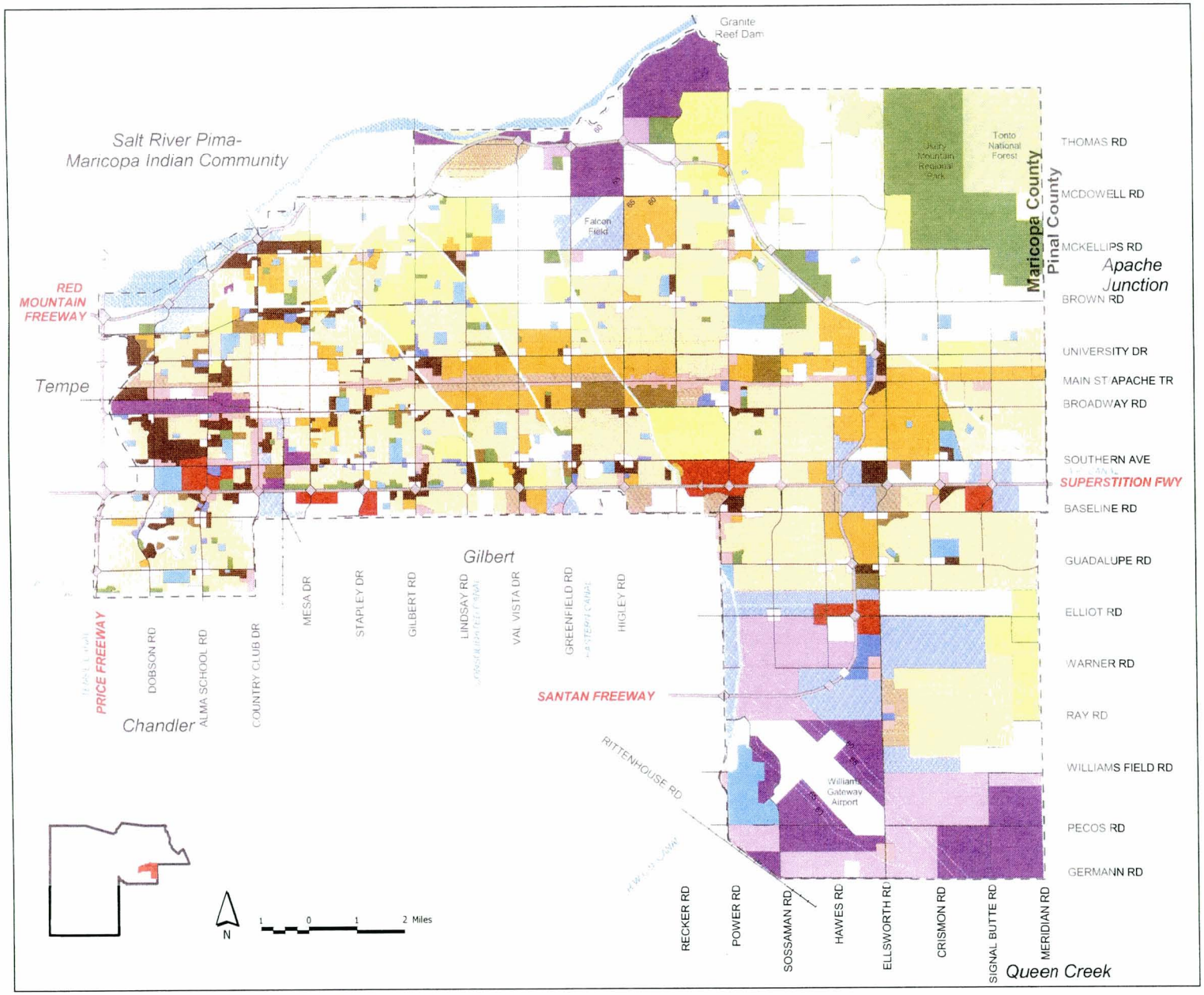
Reports reviewed as a part of this study included "City of Mesa Drainage System Evaluation" by Tetra Tech, Inc., September 1999, "East Mesa Area Drainage Master Plan" by the Flood Control District of Maricopa County, July 1998 and "Santan Freeway (202L) Power Road to Elliot Road Initial Drainage Report" by the Arizona Department of Transportation, June 2002. Specific documents referenced include Exhibit "B" City of Mesa Proposed Storm Drains and Drainage Area Map, September 1999 and Construction Plans for "Elliot Road Detention Basins and Outfall Channel, Phase I", PCN No. 442 04 31, prepared by Wood Patel & Associates, Inc., dated May 2, 2000.



LOCATION MAP

FIGURE 1

PREMIER



GENERAL PLAN

Land Use Plan

Figure 2-6

Residential

- Low Density Residential 0-1 (0 - 1 du/ac)
- Low Density Residential 1-2 (1 - 2 du/ac)
- Medium Density Residential 2-4 (2 - 4 du/ac)
- Medium Density Residential 4-6 (4 - 6 du/ac)
- Medium Density Residential 6-10 (6 - 10 du/ac)
- High Density Residential 10-15 (10 - 15 du/ac)
- High Density Residential 15+ (15+ du/ac)

Commercial

- Neighborhood Commercial
- Community Commercial
- Regional Commercial

Mixed Use

- Mixed Use/Residential (30% at 15+ du/ac)
- Mixed Use/Employment
- Town Center (25% at 15+ du/ac)

Employment

- Office
- Business Park
- Light Industrial
- General Industrial

Public/Institutional

- Public/Semi-Public
- Education
- Parks
- Natural Area Open Space

- Planning Area Boundary
- City Limits
- Freeway
- Arterial Roadway
- Canals and Waterways
- Aviation Noise Contours
- Overhead Transmission Lines
- Interchange
- Future Interchange

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MESA 2025
A Shared Vision

FIGURE 2, PAGE 3

2 HYDROLOGY

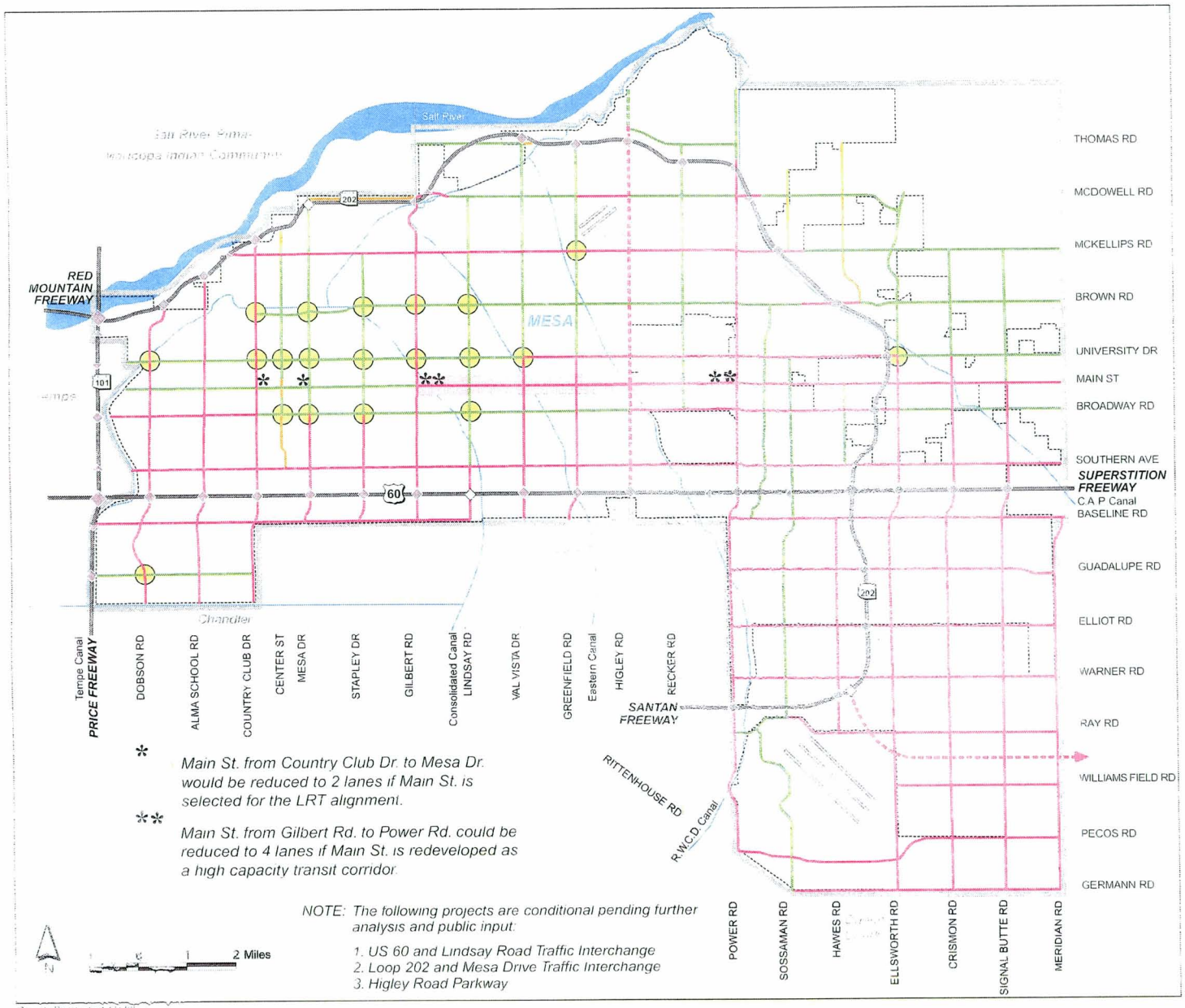
A hydrologic analysis was undertaken to estimate the runoff from a 10-year event for the arterial street right-of-way in the study area. It was assumed no storm water would be contributed from areas outside the study area except for the sub-basins between Elliot Road and U.S. 60, which drain to the culverts shown on the "East Mesa Area Drainage Master Plan". The Rational Method was used in accordance with the City of Mesa "Procedure Manual, Engineering & Design Standards, Section 6, Drainage". Areas and weighted C values were computed for ¼ mile segments of the arterial streets. The proposed street plan of 6-lane and 4-lane arterials is shown in Figure 3. Areas and weighted C values were also computed for intersections, which include widened rights of way and street turn lanes. City of Mesa Standard Drawings M-46.1 and M-46.2 were used for that analysis (see Figures 4 and 5). It was assumed collector streets would be located on each ¼ mile segment; therefore, the area and weighted C values for these intersections were computed. The results have been tabulated in Table 1.

Table 1

Areas and Weighted C Values

Location	Length	Area	Cw
6-lane Arterial, centerline to end of taper	630'	2.10 ac.	0.80
6-lane Arterial, collector street intersection	109'	0.36 ac.	0.81
6-lane Arterial, normal section	L	L x 130'	0.75
4-lane Arterial, 90' from centerline to end of taper	550'	1.77 ac.	0.79
4-lane Arterial, collector street intersection	109'	0.32 ac.	0.79
4-lane Arterial, normal section	L	L x 130'	0.69

Using this data, the area, weighted C value and resulting CA value was computed for each ¼ mile segment of the arterials. These computations have been included in Appendix A.



* Main St. from Country Club Dr. to Mesa Dr. would be reduced to 2 lanes if Main St. is selected for the LRT alignment.

** Main St. from Gilbert Rd. to Power Rd. could be reduced to 4 lanes if Main St. is redeveloped as a high capacity transit corridor.

NOTE: The following projects are conditional pending further analysis and public input:

1. US 60 and Lindsay Road Traffic Interchange
2. Loop 202 and Mesa Drive Traffic Interchange
3. Higley Road Parkway

Transportation Plan

MESA 2025
A Shared Vision

Recommended Street Plan

Figure ES-2

- intersection Improvement
- 6 Lane Parkway
- 4 Lane Parkway
- 6 Lane Arterial
- 4 Lane Arterial/Collector
- 2 Lane Arterial/Collector
- Freeway
- Interchange
- Future Interchange
- Major Arterial Roadway
- Canals and Waterways

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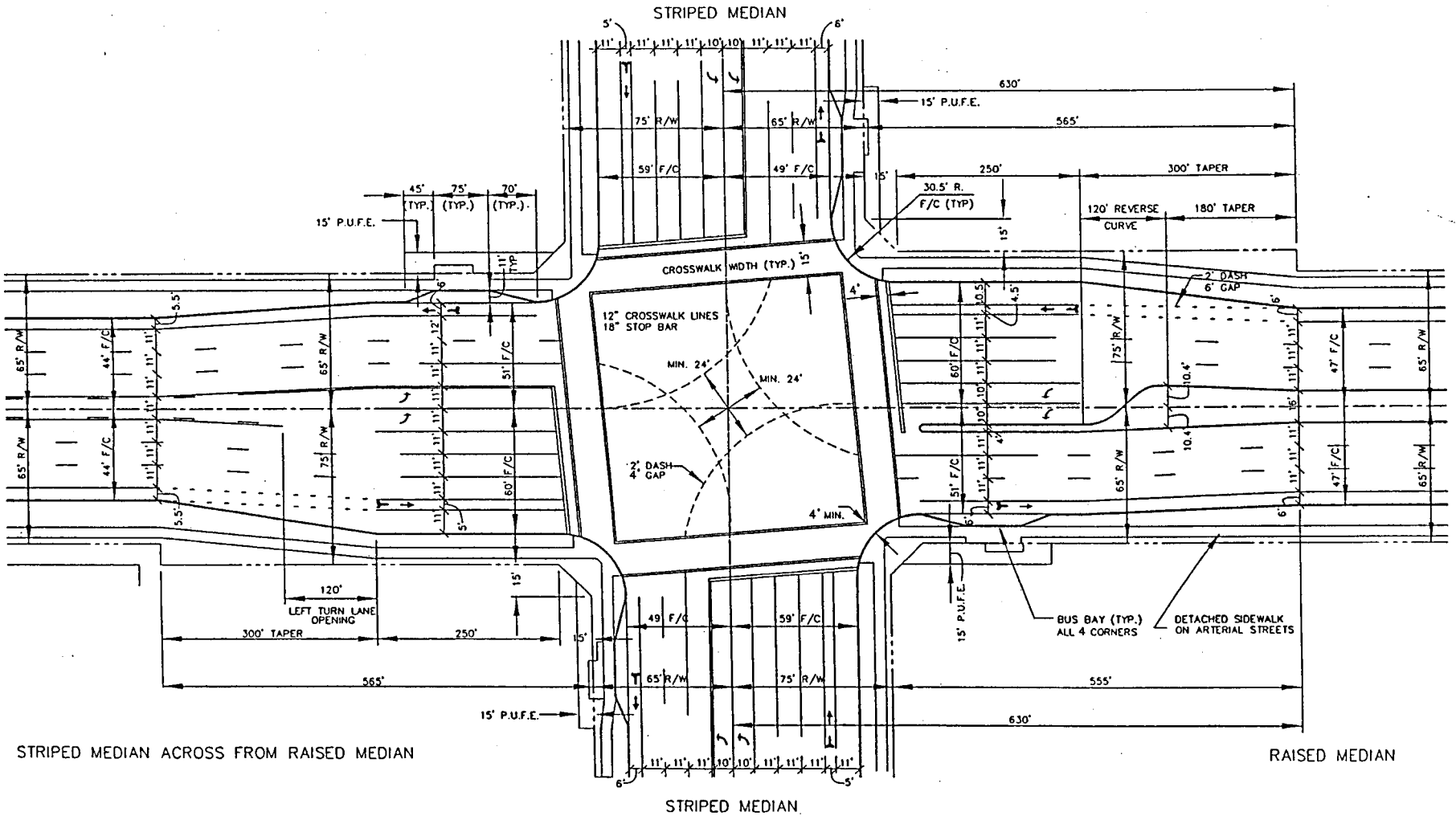
FIGURE 3, PAGE 5



ARTERIAL STREET INTERSECTION (6 LANES)

NOT TO SCALE

ARTERIAL STREET INTERSECTION (6 LANES)

DETAIL NO. M-46.2

EFF 2/24/03

FIGURE 4, PAGE 6

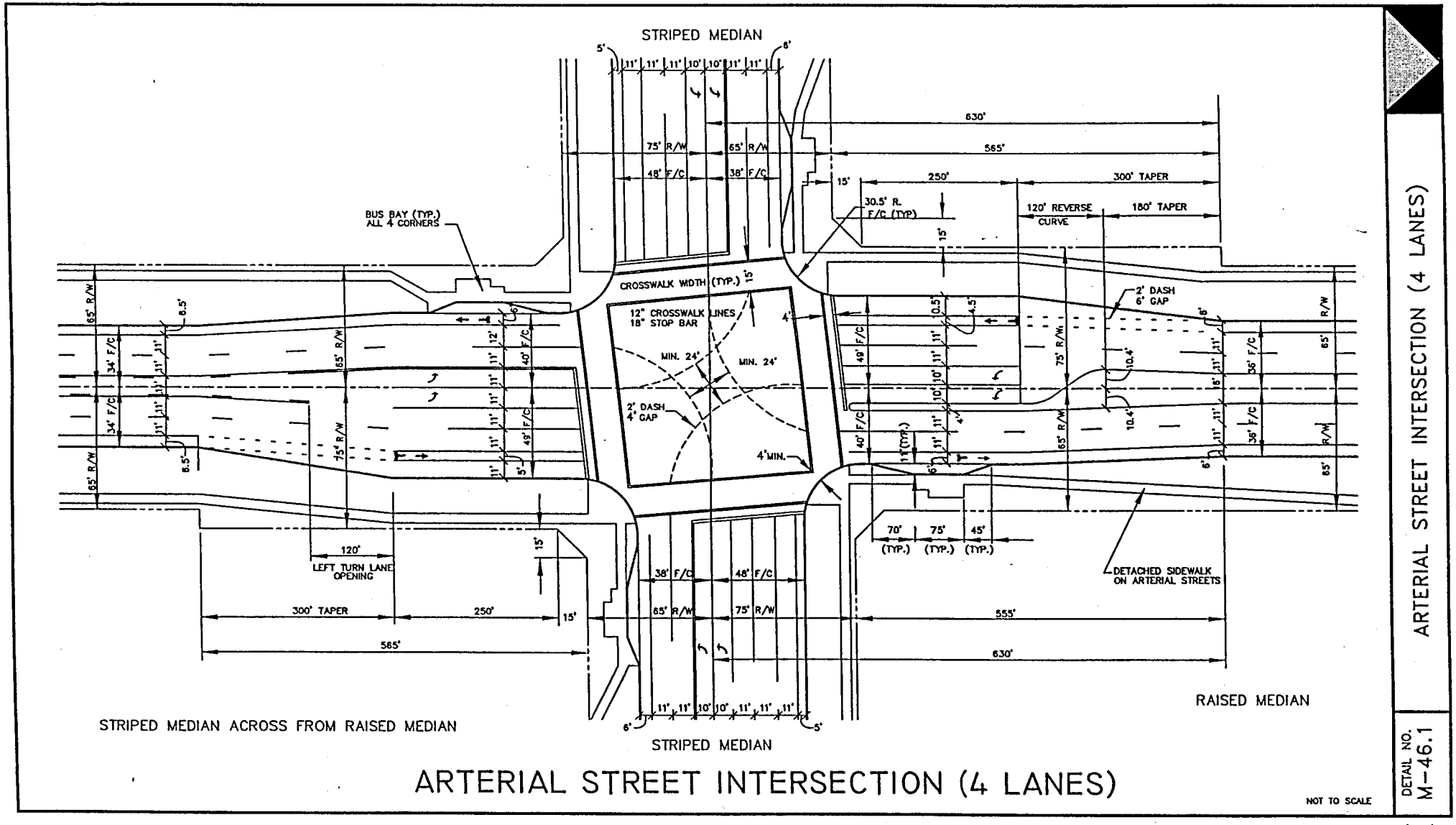


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FIGURE 5, PAGE 7

3 PROPOSED STORM DRAIN SYSTEM

The proposed system of storm drains to be constructed in the arterial streets will have to be the proper size and have a sufficient outlet. It was necessary to review existing drainage facilities and proposed future facilities. With this information the proposed system could be laid out following natural drainage patterns. After the 10-year peak discharge rates were computed, pipe culvert sizes were determined assuming flowing full conditions. The outlet of each line was then checked for adequate capacity and depth to accommodate the proposed culvert.

3.1 Existing and Proposed Drainage Facilities

Existing floodways are located along the east side of the RWCD Canal (just east of Power Road), Ray Road, Elliot Road and Rittenhouse Road alignments. These consist of the East Maricopa Floodway, Powerline Floodway, Elliot Channel and Rittenhouse Channel, respectively. The Santan Freeway is being designed by the Arizona Department of Transportation. The alignment enters the City of Mesa at Power Road between Ray Road and Warner Road. The freeway travels due east to Hawes Road and then curves north between Hawes Road and Ellsworth Road to its intersection with U.S. 60. Along the east and south side of the freeway will be constructed a series of concrete channels collectively termed the Santan Freeway Channel in this report.

The Elliot Detention Basins and Outfall Channel, Phase I was also recently constructed. These improvements included the construction of three detention basins, an outfall channel and diversion channel south along Crismon Road, and an underground storm-drain pipe system. Two of the detention basins are located at the northwest corner of Elliot and Crismon and the other is just east of Crismon along the north side of Elliot. The underground storm-drain pipe system consists of a series of storm-drain pipe starting from the east detention basin flowing west along the south side of Elliot Road, turning south along Ellsworth and outletting into the outfall channel. The outfall channel drains southwesterly and will eventually contribute to the Santan Freeway Channel. The storm-drain pipe system varies from 60-inch to 2-102-inch rubber gasket reinforced concrete pipes.

Other projects presently being designed are the Ellsworth Road improvements, Pecos Channel and Detention Basins, and Meridian North and South Channels (See Figure 7). The Ellsworth Road channel will be constructed in 2004 as part of the MCDOT's project for Ellsworth improvements. Included in this project is a channel parallel to Ellsworth Road from Germann Road to Powerline Floodway. The Pecos Channel will drain westerly along the Pecos Road alignment from Meridian Road outletting into the Ellsworth Channel. Included as part of the Pecos Channel system are two detention basins located along the east side of Meridian Road north and south of Pecos Road. The Meridian South Channel will drain northerly from Queen Creek Road along the Meridian Road alignment and outlet into the Pecos Channel. The Meridian North Channel will drain southerly from Williams Field Road along the Meridian Road alignment through the Pecos North Detention Basin and eventually outlet into the Pecos Channel. Per direction from the City of Mesa, this analysis has been prepared assuming that the Ellsworth Channel is constructed from Germann Road north to the Powerline Floodway and from Elliot Road south to the Powerline Floodway.

Other drainage facilities have been proposed in the "East Mesa Area Drainage Master Plan". It has not been determined which of these facilities, if any, will be constructed. Figure 7, "Project Phasing" shows and prioritizes the proposed channels and detention basins. For the purpose of this study, it was assumed none would be available for use with the proposed storm drain system unless specifically noted herein (e.g. Elliot Road basins, Pecos Channel, Meridian Channels). If funding is made available for these facilities, it is recommended the proposed drainage system be reviewed and amended as required.

The proposed arterial storm drain system in Germann Road is proposed in the future to be Queens Creeks responsibility.

3.2 Proposed Arterial Street Drainage Plan

USGS quad maps for the area were reviewed to determine the existing drainage patterns and average slope of natural ground between arterial streets. Flow patterns indicate storm water runoff flows predominantly to the west and southwest. Based on this information it was proposed to locate the storm drains in the east-west arterial streets. Drainage from the north-south arterial streets would flow to the east-west storm drains. The north-south storm drains would flow in the direction of the natural flow pattern if the slope averages 0.4% or more. Arterial streets with less than 0.4% slope would be split with drainage to the nearest storm drain to the north and to the south. Outlets for the storm drain mains would be the Elliot Detention Basin/Storm-drain system, Ellsworth Channel, Santan Freeway Channel, East Maricopa Floodway, Powerline Floodway, Pecos Channel, and Rittenhouse Channel. The proposed arterial street drainage plan is shown in Figure 6. Appendix D contains a representative storm-main profile for Warner Road from the Santan Freeway Channel to Meridian.

3.3 Hydrology and Hydraulic Analyses

The peak discharge rate for a 10-year event was computed for each ¼ mile segment of the proposed storm drain system following the drainage routing patterns indicated on Figure 6. These rates were calculated using the Rational Method in accordance with the City of Mesa procedures. The time of concentration for each sub-basin was set equal to the travel time of pipe flow. It was assumed that the pipe was flowing full and the slope of the pipe was the same as the ground slope. By iterations the proper time of concentration was determined. Due to the limited area of non-paved surfaces, the sheet flow time to the gutter was ignored. It was also assumed that the travel time in the gutter would equal the pipe flow time. The calculated time of concentration at the ¼ mile concentration points were equal or greater than the minimum 5-minute time of concentration allowed per City of Mesa Design Guidelines. In the final design phase, depending on the location of the most upstream catch basin, the time of concentration may be longer than the time of concentration presented in this report. Based on these assumptions, the computed storm drain main sizes, presented in this report, may be slightly larger than the actual sizes, which have to be determined during the final design phase when additional topography and details are available.

Rainfall intensity-duration-frequency relations were taken from Figure 6-3 of the City of Mesa Engineering and Design Standards. These values for a 10-year event are shown in Table 2.

Table 2

Rainfall Intensity-Duration-Frequency Relation

10-year Storm

(From City of Mesa Engineering and Design Standards, Figure 6-3)

Tc (minutes)	Intensity (in./hr.)
5	5.1
6	5.0
7	4.9
8	4.7
9	4.6
10	4.4
11	4.2
12	4.1
13	3.9
14	3.8
15	3.7
16	3.6
17	3.5
18	3.4
19	3.3
20	3.2
21	3.1
22	3.1
23	3.0
24	2.9
25	2.8
30	2.5
35	2.3
40	2.0
45	1.8

In determining the size of the proposed culverts, it was assumed the drainage system would consist of reinforced concrete pipes. Manning's' Equation was used to compute the pipe size necessary to convey the peak discharge without surcharging. The calculations were made using n = 0.013. See Table 3 for the culvert sizes of each line. Figure 7 consists of the storm drain system with culvert sizes shown. A more detailed layout of each storm drain line is included in Appendix C.

Table 3

Proposed Storm Drain System

Line	Street	From	To	Pipe Dia. (in.)
1	Germann Rd.	Ellsworth Road	Rittenhouse Channel	54"-60"
1.1	Sossaman Rd.	¼ mi. north on Sossaman Road	Line 1	24"
2	Germann Rd.	Meridian Road	Line 1 (Rittenhouse Channel)	24"-54"
2.1	Crismon Rd.	¼ mi. north on Crismon Road	Line 2	24"
2.2	Signal Butte	½ mi. north on Signal Butte Road	Line 2	24"-30"
3	Pecos Rd.	Ellsworth Road	East Maricopa Floodway	30"-48"
3.1	Sossaman Rd.	¾ mi. south on Sossaman Road	Line 3	24"-36"
4	Pecos Rd.	Meridian Road	Ellsworth Road Channel	N/A
4.1	Crismon Rd.	¾ mi. south on Crismon Road	Pecos Channel	24"-36"
4.2	Crismon Rd.	½ mi. north on Crismon Road	Pecos Channel	24"-30"
4.3	Signal Butte	½ mi. south on Signal Butte Road	Pecos Channel	24"-30"
4.4	Signal Butte	½ mi. north on Signal Butte Road	Pecos Channel	24"-30"
4.5	Ellsworth Road	1 mi. south on Ellsworth Road	Pecos Channel	24"-30"
5	William Field	Meridian Road	Ellsworth Road Channel	42"-60"
5.1	Crismon Rd.	½ mi. south on Crismon Road	Line 5	24"-30"
5.2	Crismon Rd.	¾ mi. north on Crismon Road	Line 5	24"-36"
5.3	Signal Butte	½ mi. south on Signal Butte Road	Line 5	24"-30"
5.4	Signal Butte	¾ mi. north on Signal Butte Road	Line 5	24"-36"

Table 3 (continued)

Proposed Storm Drain System

Line	Street	From	To	Pipe Diameter (in.)
5.5	Meridian Rd.	¼ mi. south on Meridian Road	Line 5	24"
5.6	Meridian Rd.	¾ mi. north on Meridian Road	Line 5	24"-36"
6	Ray Rd.	Meridian Road	Powerline Floodway	42"
6.1	Sossaman Rd.	2 mi. south on Sossaman Road	Powerline Floodway	24"-42"
6.2	Sossaman Rd.	½ mi. north on Sossaman Road	Powerline Floodway	24"-30"
6.3	Hawes Rd.	¾ mi. north on Hawes Road	Powerline Floodway	24"-30"
6.4	Ellsworth Rd.	Warner Rd.	Powerline Floodway	N/A
6.5	Crismon Rd.	¼ mi. south on Crismon Road	Powerline Floodway	24"
6.6	Crismon Rd.	½ mi. north on Crismon Road	Powerline Floodway	24"-30"
6.7	Signal Butte Rd.	¼ mi. south on Signal Butte Road	Powerline Floodway	24"
6.8	Signal Butte	¾ mi. north on Signal Butte Road	Powerline Floodway	24"-36"
6.9	Meridian Rd.	¼ mi. south on Meridian Road	Line 6	24"
6.10	Meridian Rd.	¾ mi. north on Meridian Road	Line 6	24"-36"
7	Warner Rd.	Santan Freeway	East Maricopa Floodway	42"-54"
7.1	Sossaman Rd.	½ mi. south on Sossaman Road	Line 7	24"-30"
7.2	Sossaman Rd.	½ mi. north on Sossaman Road	Line 7	24"-30"
7.3	Hawes Rd.	¼ mi. south on Hawes Road	Line 7	24"
7.4	Hawes Rd.	½ mi. north on Hawes Road	Line 7	24"-30"
8	Warner Rd.	Meridian Road	Ellsworth Channel	42"-54"
8.1	Ellsworth Rd.	1 mile north on Ellsworth Rd.	Diversion Channel	N/A
8.2	Ellsworth Rd.	½ mile north on Ellsworth Rd.	Line 8	N/A
8.3	Crismon Rd.	½ mi. south on Crismon Road	Line 8	24"-30"
8.4	Crismon Rd.	½ mi. north on Crismon Road	Line 8	24"-30"
8.5	Signal Butte	¼ mi. south on Signal Butte Road	Line 8	24"
8.6	Signal Butte	½ mi. north on Signal Butte Road	Line 8	24"-30"
8.7	Meridian Rd.	¼ mi. south on Meridian Road	Line 8	24"
8.8	Meridian Rd.	¾ mi. north on Meridian Road	Line 8	24"-36"

Table 3 (continued)

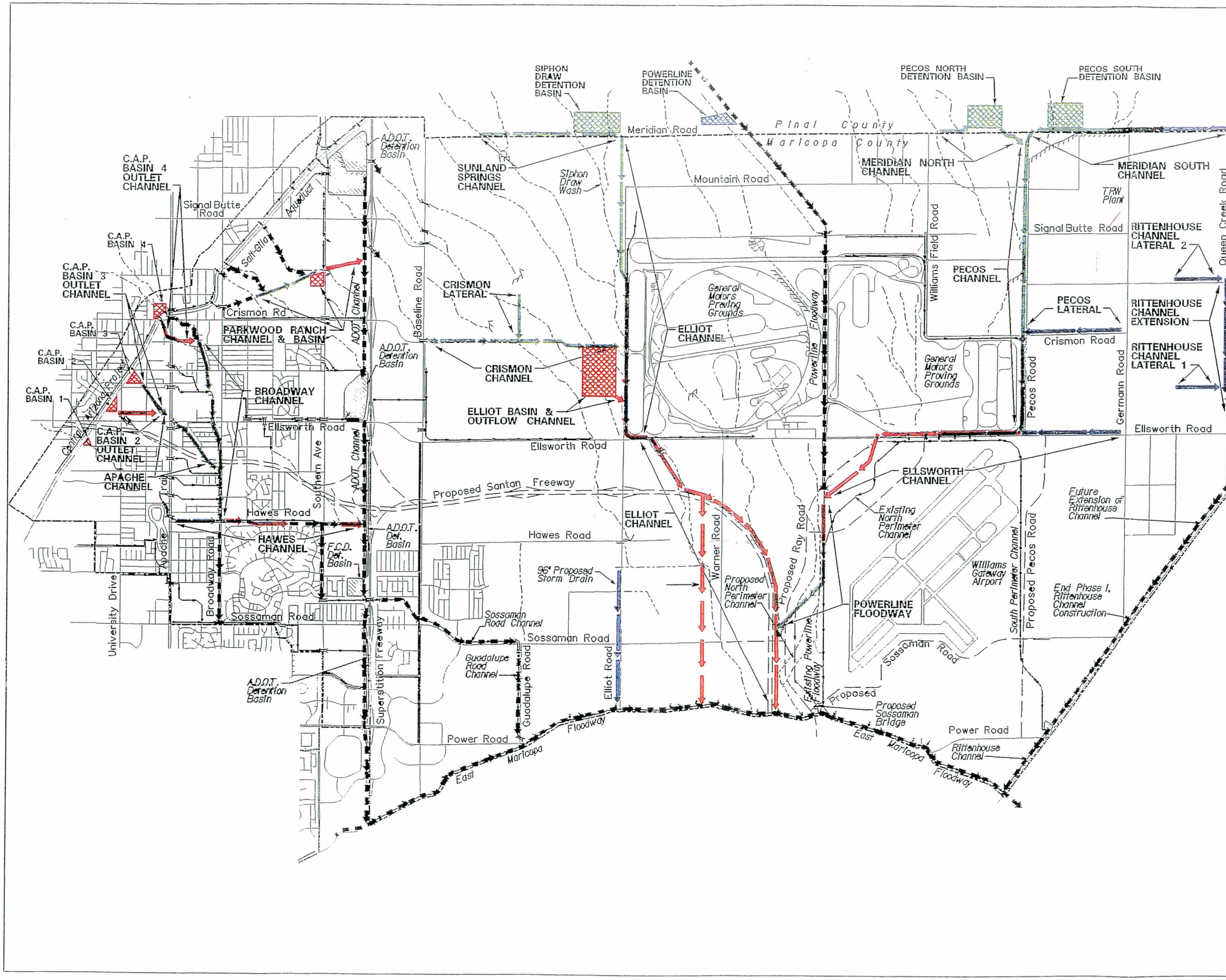
Proposed Storm Drain System

Line	Street	From	To	Pipe Dia. (in.
9	Elliot Rd.	Santan Freeway	East Maricopa Floodway	24"-60"
9.1	Sossaman Rd.	½ mi. south on Sossaman Road	Line 9	24"-30"
9.2	Sossaman Rd.	Guadalupe Road	Line 9	24"-42"
9.3	Hawes Rd.	½ mi. south on Hawes Road	Line 9	24"-30"
9.4	Hawes Rd.	Guadalupe Road	Line 9	24"-42"
10	Elliot Rd.	Meridian Road	Elliot Det. Basin/Channel	42"-60"
10.1	Ellsworth Rd.	- (Ellsworth Channel)	-	N/A
10.2	Ellsworth Rd.	- (Ellsworth Channel)	-	N/A
10.3	Crismon Rd.	½ mi. south on Crismon Road	Line 10	24"-30"
10.4	Crismon Rd.	U.S. 60	Line 10	24"-48"
10.4.1	Baseline Ave.	Signal Butte Road	Line 10.4	24"-42"
10.5	Signal Butte	½ mi. south on Signal Butte Road	Line 10	24"-30"
10.6	Signal Butte	U.S. 60	Line 10	24"-54"
10.6.1	Guadalupe Rd.	Meridian Road	Line 10.6	24"-42"
10.6.2	Meridian Rd.	U.S. 60	Line 10.6	24"-42"
10.7	Meridian Rd.	¼ mi. south on Meridian Road	Line 10	24"
10.8	Meridian Rd.	Baseline Road	Line 10	24"-42"
11	Warner Rd.	Ellsworth	Santan Freeway Channel	24"-30"
12	Elliot Rd.	Ellsworth	Santan Freeway Channel	24"

Figure 6: Proposed Storm Drain Culvert Mains
(See pocket inside back cover)

4 CONCLUSION AND RECOMMENDATIONS

The results of this study may be used in the design of future storm drain segments. It should be noted the proposed system would not be adequate for existing conditions, which have offsite sub-basins draining to the arterial streets. The drainage from other sub-basins outside the study area has not been included in these analyses. Changes to these and other pertinent criteria can have an effect on drainage patterns and volumes. It is recommended that this report be used as a general guide and updated upon installation of drainage facilities within the study area.



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

East Mesa Area Drainage Master Plan

F.C.D. CONTRACT NO. 95-32

LEGEND

- STUDY BOUNDARY
- EXISTING CHANNEL/DITCH
- EXISTING BRIDGE/CULVERT
- EXISTING STORM DRAIN
- EXISTING ROADWAY DIP SECTION/ WEIR/OVER-CHUTE
- EXISTING DIVERSION DIKE
- EXISTING WASH
- PROPOSED ROAD ALIGNMENT
- PROPOSED CHANNEL/STORM DRAIN
  - PRIORITY 1
  - PRIORITY 2
  - PRIORITY 3
- EXISTING/PLANNED MAJOR CHANNEL
- PROPOSED DETENTION BASIN
  - PRIORITY 1
  - PRIORITY 2
  - PRIORITY 3

N

2500 0' 2500 5000

SCALE: 1" = 5000'

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

Hoskin Engineering Consultants

PROJECT PHASING

FIGURE 9

FIGURE 7, PAGE 17

5 REFERENCES

1. "East Mesa Area Drainage Master Plan" by the Flood Control District of Maricopa County, September 1999.
2. "Santan Freeway (202L) Power Road to Elliot Road Initial Drainage Report" by the Arizona Department of Transportation, June 2002.
3. "City of Mesa Drainage System Evaluation" and "Exhibit B - City of Mesa Proposed Storm Drains and Drainage Area Map", by Tetra Tech, Inc., September 1999.
4. "Procedure Manual, Engineering & Design Standards" by City of Mesa, December 1990.
5. Maricopa County, Arizona. *Drainage Design Manual, Volume I, Hydrology*, January 28, 1996.
6. "Elliot Road Detention Basins and Outfall Channel, Phase I" Construction Documents, by Wood Patel & Associates, Inc., May 2000.

Appendix A: Sub-basin Drainage Areas and Weighted C Values

City of Mesa
Southeast Arterials Drainage Study
Project No. 01-698-001
Sub-basin Drainage Areas and Weighted C Values

Street			Intersection			Arterial Only			Collector Streets			
Type	Beginning Point	Ending Point	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	CA (ac)
6 Lane	Baseline & Meridian	0.25 mi west	630	2.29	0.80	581	1.73	0.75	109	0.36	0.81	3.42
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Baseline & Signal Bu	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Baseline & Signal Bu	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Baseline & Crismon	630	2.29	0.80	581	1.73	0.75	109	0.36	0.81	3.42

City of Mesa
Southeast Arterials Drainage Study
Project No. 01-698-001
Sub-basin Drainage Areas and Weighted C Values

Street			Intersection			Arterial Only			Collector Streets			
Type	Beginning Point	Ending Point	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	CA (ac)
6 Lane	Guadalupe & Meridian	0.25 mi west	630	1.77	0.79	581	1.73	0.75	109	0.36	0.81	2.99
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Guadalupe & Signal Bu	630	2.29	0.80	581	1.73	0.75	109	0.36	0.81	3.42

City of Mesa
Southeast Arterials Drainage Study
Project No. 01-698-001
Sub-basin Drainage Areas and Weighted C Values

Street			Intersection			Arterial Only			Collector Streets			
Type	Beginning Point	Ending Point	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	CA (ac)
6 Lane	Elliot & Meridian	0.25 mi west	630	2.29	0.80	581	1.73	0.75	109	0.36	0.81	3.42
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Elliot & Signal Butte	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Elliot & Signal Butte	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi west (Elliot Det. Basins/Storm-drain system)				1211	3.61	0.75	109	0.36	0.81	3.00
	Elliot & Ellsworth	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		Elliot & Santan Fwy.	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Elliot & Santan Fwy.	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		Elliot & Hawes	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Elliot & Hawes	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Elliot & Sossaman	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Elliot & Sossaman	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Elliot & Power	630	2.29	0.80	581	1.73	0.75	109	0.36	0.81	3.42

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Street			Intersection			Arterial Only			Collector Streets			
Type	Beginning Point	Ending Point	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	CA (ac)
6 Lane	Warner & Meridian	0.25 mi west	630	2.29	0.80	581	1.73	0.75	109	0.36	0.81	3.42
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Warner & Signal Bu.	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Warner & Signal Bu.	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Warner & Crismon	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Warner & Crismon	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Ellsworth Channel	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Warner & Ellsworth	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		Warner & Santan Fwy.	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Warner & Santan Fwy.	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		Warner & Sossaman	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Warner & Sossaman	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Warner & Power	630	2.29	0.80	581	1.73	0.75	109	0.36	0.81	3.42

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Street			Intersection			Arterial Only			Collector Streets			
Type	Beginning Point	Ending Point	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	CA (ac)
6 Lane	Ray & Meridian	0.25 mi west	630	2.29	0.80	581	1.73	0.75	109	0.36	0.81	3.42
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Ray & Signal Butte	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Ray & Signal Butte	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Ray & Crismon	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Ray & Crismon	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Ray & Ellsworth	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Ray & Ellsworth	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Ray & Hawes	630	2.08	0.80	581	1.73	0.75	109	0.36	0.81	3.25
	Ray & Hawes	0.25 mi west	630	2.08	0.80	581	1.73	0.75	109	0.36	0.81	3.25
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Ray & Sossaman	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Ray & Sossaman	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Ray & Power	630	2.29	0.80	581	1.73	0.75	109	0.36	0.81	3.42

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Street			Intersection			Arterial Only			Collector Streets			
Type	Beginning Point	Ending Point	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	CA (ac)
6 Lane	Wm Field & Meridian	0.25 mi west	630	2.29	0.80	581	1.73	0.75	109	0.36	0.81	3.42
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Wm Field & Signal Bu.	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Wm Field & Signal Bu.	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Wm Field & Crismon	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Wm Field & Crismon	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Wm Field & Ellsworth	630	2.29	0.80	581	1.73	0.75	109	0.36	0.81	3.42

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Street			Intersection			Arterial Only			Collector Streets			
Type	Beginning Point	Ending Point	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	CA (ac)
6 Lane	Pecos & Hawes	0.25 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Pecos & Sossaman	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Pecos & Sossaman	0.25 mi west	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Pecos & Power	630	2.29	0.80	581	1.73	0.75	109	0.36	0.81	3.42

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Street			Intersection			Arterial Only			Collector Streets			
Type	Beginning Point	Ending Point	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	CA (ac)
6 Lane	Germann & Meridian	0.25 mi west	630	2.18	0.80	581	1.73	0.75	109	0.36	0.81	3.33
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Germann & Signal Bu.	630	2.08	0.80	581	1.73	0.75	109	0.36	0.81	3.25
	Germann & Signal Bu.	0.25 mi west	630	2.08	0.80	581	1.73	0.75	109	0.36	0.81	3.25
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Germann & Crismon	630	2.08	0.80	581	1.73	0.75	109	0.36	0.81	3.25
	Germann & Crismon	0.25 mi west	630	2.08	0.80	581	1.73	0.75	109	0.36	0.81	3.25
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Germann & Ellsworth	630	2.08	0.80	581	1.73	0.75	109	0.36	0.81	3.25
	Germann & Ellsworth	0.25 mi west	630	2.08	0.80	581	1.73	0.75	109	0.36	0.81	3.25
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Germann & Hawes				1211	3.61	0.75	109	0.36	0.81	3.00
	Germann & Hawes	0.25 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.50 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi west				1211	3.61	0.75	109	0.36	0.81	3.00
		Germann & Sossaman	630	2.18	0.80	581	1.73	0.75	109	0.36	0.81	3.33

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Street			Intersection			Arterial Only			Collector Streets			
Type	Beginning Point	Ending Point	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	CA (ac)
6 Lane	Meridian & US 60	0.25 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		Meridian & Baseline	630	1.77	0.79	581	1.73	0.75	109	0.36	0.81	2.99
	Meridian & Baseline	0.25 mi south	630	1.77	0.79	581	1.73	0.75	109	0.36	0.81	2.99
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		Meridian & Guadalupe	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Meridian & Guadalupe	0.25 mi south	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Elliot	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Elliot	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Warner	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Warner	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Ray	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Ray	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Wm Field	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96

90' north Wm Field	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
	0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
	90' north Pecos	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96

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Street			Intersection			Arterial Only			Collector Streets			
Type	Beginning Point	Ending Point	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	CA (ac)
6 Lane	Signal Butte & US 60	0.25 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		Signal Bu & Baseline	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Signal Bu & Baseline	0.25 mi south	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		Signal Bu & Guadalupe	630	2.08	0.80	581	1.73	0.75	109	0.36	0.81	3.25
	Signal Bu & Guadalupe	0.25 mi south	630	2.08	0.80	581	1.73	0.75	109	0.36	0.81	3.25
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Elliot	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Elliot	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Warner	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Warner	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Ray	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Ray	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Wm Field	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96

90' north Wm Field	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
	0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
	90' north Pecos	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
90' north Pecos	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
	0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
	90' north Germann	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96

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Street Type	Beginning Point	Ending Point	Intersection Distance (ft)	Intersection Area (ac)	Intersection Cw	Arterial Only Distance (ft)	Arterial Only Area (ac)	Arterial Only Cw	Collector Streets Distance (ft)	Collector Streets Area (ac)	Collector Streets Cw	CA (ac)
6 Lane	Crismon & US 60	0.25 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		Crismon & Baseline	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
	Crismon & Baseline	0.25 mi south	630	2.10	0.80	581	1.73	0.75	109	0.36	0.81	3.27
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		Crismon & Guadalupe				1211	3.61	0.75	109	0.36	0.81	3.00
	Crismon & Guadalupe	0.25 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Elliot	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Elliot	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Warner	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Warner	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Ray	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Ray	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Wm Field	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96

90' north Wm Field	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
	0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
	90' north Pecos	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
90' north Pecos	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
	0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
	90' north Germann	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96

City of Mesa
Southeast Arterials Drainage Study
Project No. 01-698-001
Sub-basin Drainage Areas and Weighted C Values

Street			Intersection			Arterial Only			Collector Streets			
Type	Beginning Point	Ending Point	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	CA (ac)
	Ellsworth & Guadalupe	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Elliot	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Elliot	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Warner	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Warner	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Ray	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Ray	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Wm Field	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Wm Field	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Pecos	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Pecos	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Germann	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96

City of Mesa
Southeast Arterials Drainage Study
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Sub-basin Drainage Areas and Weighted C Values

Street			Intersection			Arterial Only			Collector Streets			
Type	Beginning Point	Ending Point	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	CA (ac)
	Hawes & Guadalupe	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Elliot	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Elliot	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Warner	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
	90' north Warner	0.25 mi south	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96
		0.50 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		0.75 mi south				1211	3.61	0.75	109	0.36	0.81	3.00
		90' north Ray	550	1.77	0.79	571	1.70	0.75	109	0.36	0.81	2.96

City of Mesa
Southeast Arterials Drainage Study
Project No. 01-698-001
Sub-basin Drainage Areas and Weighted C Values

Street			Intersection			Arterial Only			Collector Streets			
Type	Beginning Point	Ending Point	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	Distance (ft)	Area (ac)	Cw	CA (ac)
4 Lane	Sossaman & Guadalup	0.25 mi south	540	1.61	0.81	581	1.73	0.69	109	0.36	0.81	2.79
		0.50 mi south				1211	3.61	0.69	109	0.36	0.81	2.78
		0.75 mi south				1211	3.61	0.69	109	0.36	0.81	2.78
		90' north Elliot	540	1.61	0.81	581	1.73	0.69	109	0.36	0.81	2.79
	90' north Elliot	0.25 mi south	540	1.61	0.81	581	1.73	0.69	109	0.36	0.81	2.79
		0.50 mi south				1211	3.61	0.69	109	0.36	0.81	2.78
		0.75 mi south				1211	3.61	0.69	109	0.36	0.81	2.78
		90' north Warner	540	1.61	0.81	581	1.73	0.69	109	0.36	0.81	2.79
	90' north Warner	0.25 mi south	540	1.61	0.81	581	1.73	0.69	109	0.36	0.81	2.79
		0.50 mi south				1211	3.61	0.69	109	0.36	0.81	2.78
		0.75 mi south				1211	3.61	0.69	109	0.36	0.81	2.78
		90' north Ray	540	1.61	0.81	581	1.73	0.69	109	0.36	0.81	2.79
	90' north Ray	0.25 mi south	540	1.61	0.81	581	1.73	0.69	109	0.36	0.81	2.79
		0.50 mi south				1211	3.61	0.69	109	0.36	0.81	2.78
		0.75 mi south				1211	3.61	0.69	109	0.36	0.81	2.78
		90' north Wm Field	540	1.61	0.81	581	1.73	0.69	109	0.36	0.81	2.79
	90' north Wm Field	0.25 mi south	540	1.61	0.81	581	1.73	0.69	109	0.36	0.81	2.79
		0.50 mi south				1211	3.61	0.69	109	0.36	0.81	2.78
		0.75 mi south				1211	3.61	0.69	109	0.36	0.81	2.78
		90' north Pecos	540	1.61	0.81	581	1.73	0.69	109	0.36	0.81	2.79
	90' north Pecos	0.25 mi south	540	1.61	0.81	581	1.73	0.69	109	0.36	0.81	2.79
		0.50 mi south				1211	3.61	0.69	109	0.36	0.81	2.78
		0.75 mi south				1211	3.61	0.69	109	0.36	0.81	2.78
		90' north Germann	540	1.61	0.81	581	1.73	0.69	109	0.36	0.81	2.79

Appendix B: 10-year Peak Runoff and Proposed Storm Drain System

City of Mesa
Southeast Arterials Drainage Study
Project No. 01-698-001
10-Year Peak Runoff and Proposed Storm Drain System

Line 1

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr)	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
1	Ellsworth	Hawes	1,320	3.25	55.71	0.0040	65	1.40	78.0	1233	54	4.90	64.8
1	Ellsworth	Hawes	1,320	3.00	58.71	0.0040	70	1.35	79.3	1253	54	4.98	69.2
1	Ellsworth	Hawes	1,320	3.00	61.71	0.0040	73	1.30	80.2	1268	54	5.04	73.6
1	Ellsworth	Hawes	1,320	3.00	64.71	0.0040	78	1.23	79.6	1258	54	5.00	78.0
1	Hawes	Sossaman	1,320	3.00	67.71	0.0040	83	1.17	79.2	1253	60	4.03	83.5
1	Hawes	Sossaman	1,320	3.00	70.71	0.0040	89	1.11	78.5	1241	60	4.00	89.0
1	Hawes	Sossaman	1,320	3.00	73.71	0.0040	95	1.05	77.4	1224	60	3.94	94.5
1	Hawes	Sossaman	1,320	3.33	77.04	0.0040	100	1.00	77.0	1218	60	3.92	100.1
1.1	Pecos	Germann	1,320	2.79	2.79	0.0040	5	5.1	14.2	225	24	4.53	4.9

Outlet to Rittenhouse Channel

Rainfall Intensity-Duration-Frequency Relation from Figure 6-3, City of Mesa Procedure Manual.
Pipe shall be circular R.C.P. with n = 0.013. Velocity and travel time computed assuming pipe flowing full.

City of Mesa
Southeast Arterials Drainage Study
Project No. 01-698-001
10-Year Peak Runoff and Proposed Storm Drain System

Line 2

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr)	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
2	Meridian	Signal Bu	1,320	3.33	3.33	0.0032	5	5.1	17.0	300	24	5.41	4.1
2	Meridian	Signal Bu	1,320	3.00	6.33	0.0032	8	4.7	29.8	526	30	6.06	7.7
2	Meridian	Signal Bu	1,320	3.00	9.33	0.0032	12	4.1	38.3	676	36	5.41	11.8
2	Meridian	Signal Bu	1,320	3.25	12.58	0.0032	15	3.7	46.5	823	36	6.58	15.1
2.2	Pecos	Germann	1,320	3.00	3.00	0.0040	5	5.1	15.3	242	24	4.87	4.5
2.2	Pecos	Germann	1,320	2.96	5.96	0.0040	8	4.7	28.0	443	30	5.71	8.4
2	Signal Bu	Crismon	1,320	3.25	21.79	0.0026	18	3.4	74.1	1453	42	7.70	18.0
2	Signal Bu	Crismon	1,320	3.00	24.79	0.0026	21	3.1	76.8	1507	42	7.99	20.7
2	Signal Bu	Crismon	1,320	3.00	27.79	0.0026	23	3.0	83.4	1635	42	8.67	23.3
2	Signal Bu	Crismon	1,320	3.25	31.04	0.0026	27	2.7	83.8	1644	48	6.67	26.6
2.1	Pecos	Germann	1,320	2.96	2.96	0.0040	5	5.1	15.1	239	24	4.81	4.6
2	Crismon	Ellsworth	1,320	3.25	37.25	0.0026	30	2.5	93.1	1826	48	7.41	29.5
2	Crismon	Ellsworth	1,320	3.00	40.25	0.0026	33	2.4	94.6	1855	54	5.95	33.2
2	Crismon	Ellsworth	1,320	3.00	43.25	0.0026	37	2.2	95.2	1866	54	5.98	36.9
2	Crismon	Ellsworth	1,320	3.25	46.50	0.0026	41	1.9	88.4	1733	54	5.56	40.9

Outlet to Ellsworth Road Channel

Rainfall Intensity-Duration-Frequency Relation from Figure 6-3, City of Mesa Procedure Manual.
Pipe shall be circular R.C.P. with n = 0.013. Velocity and travel time computed assuming pipe flowing full.

City of Mesa
Southeast Arterials Drainage Study
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10-Year Peak Runoff and Proposed Storm Drain System

Line 3

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr)	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
3	Ellsworth	Hawes	1,320	3.27	3.27	0.0034	6	5.0	16.4	280	30	3.33	6.6
3	Ellsworth	Hawes	1,320	3.00	6.27	0.0034	12	4.1	25.7	441	36	3.64	12.7
3	Ellsworth	Hawes	1,320	3.00	9.27	0.0034	17	3.5	32.4	556	36	4.59	17.4
3	Ellsworth	Hawes	1,320	3.00	12.27	0.0034	21	3.1	38.0	652	36	5.38	21.5
3	Hawes	Sossaman	1,320	3.00	15.27	0.0036	26	2.8	42.8	713	42	4.44	26.5
3	Hawes	Sossaman	1,320	3.00	18.27	0.0036	31	2.4	43.8	731	42	4.56	31.3
3	Hawes	Sossaman	1,320	3.00	21.27	0.0036	35	2.3	48.9	815	42	5.08	35.6
3	Hawes	Sossaman	1,320	3.27	24.54	0.0036	40	2.0	49.1	818	42	5.10	40.0
3.1	Germann	Pecos	1,320	2.78	2.78	0.0041	5	5.1	14.2	221	24	4.51	4.9
3.1	Germann	Pecos	1,320	2.78	5.56	0.0041	9	4.6	25.6	399	30	5.21	9.1
3.1	Germann	Pecos	1,320	2.79	8.35	0.0041	13	3.9	32.6	509	36	4.61	13.9
3	Sossaman	Power	1,320	3.27	36.16	0.0036	44	1.8	65.1	1085	48	5.18	44.2
3	Sossaman	Power	1,320	3.00	39.16	0.0036	48	1.8	70.5	1175	48	5.61	48.1
3	Sossaman	Power	1,320	3.00	42.16	0.0036	52	1.5	63.2	1054	48	5.03	52.5
3	Sossaman	Power	1,320	3.42	45.58	0.0036	56	1.4	63.8	1064	48	5.08	56.8

Outlet to East Maricopa Floodway

Rainfall Intensity-Duration-Frequency Relation from Figure 6-3, City of Mesa Procedure Manual.
Pipe shall be circular R.C.P. with n = 0.013. Velocity and travel time computed assuming pipe flowing full.

City of Mesa
Southeast Arterials Drainage Study
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10-Year Peak Runoff and Proposed Storm Drain System

Line 4

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr)	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
4.5	Germann	Pecos	1,320	2.96	3.00	0.0048	5	5.1	15.3	221	24	4.87	4.5
4.5	Germann	Pecos	1,320	3.00	6.00	0.0048	7	4.9	29.4	424	24	9.36	6.9
4.5	Germann	Pecos	1,320	3.00	9.00	0.0048	9	4.6	41.4	598	30	8.43	9.5
4.5	Germann	Pecos	1,320	2.96	11.96	0.0048	11	4.2	50.2	725	30	10.23	11.6
4.4	Wm Field	Pecos	1,320	3.00	3.00	0.0063	5	5.1	15.3	193	24	4.87	4.5
4.4	Wm Field	Pecos	1,320	2.96	5.96	0.0063	8	4.7	28.0	353	30	5.71	8.4
4.3	Germann	Pecos	1,320	3.00	3.00	0.0059	5	5.1	15.3	199	24	4.87	4.5
4.3	Germann	Pecos	1,320	2.96	5.96	0.0059	8	4.7	28.0	365	30	5.71	8.4
4.2	Wm Field	Pecos	1,320	3.00	3.00	0.0048	5	5.1	15.3	221	24	4.87	4.5
4.2	Wm Field	Pecos	1,320	2.96	5.96	0.0048	8	4.7	28.0	404	30	5.71	8.4
4.1	Germann	Pecos	1,320	3.00	3.00	0.0041	5	5.1	15.3	239	24	4.87	4.5
4.1	Germann	Pecos	1,320	3.00	6.00	0.0041	8	4.7	28.2	440	30	5.74	8.3
4.1	Germann	Pecos	1,320	2.96	8.96	0.0041	12	4.1	36.7	574	36	5.20	12.6

Outlet to Ellsworth Road Channel

Rainfall Intensity-Duration-Frequency Relation from Figure 6-3, City of Mesa Procedure Manual.
Pipe shall be circular R.C.P. with n = 0.013. Velocity and travel time computed assuming pipe flowing full.

City of Mesa
Southeast Arterials Drainage Study
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Line 5

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr)	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
5.6	Ray	Wm Field	1,320	3.00	3.00	0.0049	5	5.1	15.3	219	24	4.87	4.5
5.6	Ray	Wm Field	1,320	3.00	6.00	0.0049	8	4.7	28.2	403	30	5.74	8.3
5.6	Ray	Wm Field	1,320	2.96	8.96	0.0049	12	4.1	36.7	525	36	5.20	12.6
5.5	Pecos	Wm Field	1,320	2.96	2.96	0.0040	5	5.1	15.1	239	24	4.81	4.6
5	Meridian	Signal Bu	1,320	3.42	15.34	0.0053	16	3.6	55.2	759	42	5.74	16.4
5	Meridian	Signal Bu	1,320	3.00	18.34	0.0053	20	3.2	58.7	806	42	6.10	20.0
5	Meridian	Signal Bu	1,320	3.00	21.34	0.0053	23	3.0	64.0	879	42	6.65	23.3
5	Meridian	Signal Bu	1,320	3.27	24.61	0.0053	26	2.8	68.9	947	42	7.16	26.4
5.4	Ray	Wm Field	1,320	3.00	3.00	0.0039	5	5.1	15.3	245	24	4.87	4.5
5.4	Ray	Wm Field	1,320	3.00	6.00	0.0039	8	4.7	28.2	452	30	5.74	8.3
5.4	Ray	Wm Field	1,320	2.96	8.96	0.0039	12	4.1	36.7	588	36	5.20	12.6
5.3	Pecos	Wm Field	1,320	3.00	3.00	0.0040	5	5.1	15.3	242	24	4.87	4.5
5.3	Pecos	Wm Field	1,320	2.96	5.96	0.0040	8	4.7	28.0	443	30	5.71	8.4
5	Signal Bu	Crismon	1,320	3.27	42.80	0.0045	29	2.6	111.3	1659	54	7.00	29.5
5	Signal Bu	Crismon	1,320	3.00	45.80	0.0045	32	2.4	109.9	1639	54	6.91	32.7
5	Signal Bu	Crismon	1,320	3.00	48.80	0.0045	35	2.3	112.2	1673	54	7.06	35.8
5	Signal Bu	Crismon	1,320	3.27	52.07	0.0045	39	2.1	109.3	1630	54	6.88	39.0
5.2	Ray	Wm Field	1,320	3.00	3.00	0.0049	5	5.1	15.3	219	24	4.87	4.5
5.2	Ray	Wm Field	1,320	3.00	6.00	0.0049	8	4.7	28.2	403	30	5.74	8.3
5.2	Ray	Wm Field	1,320	2.96	8.96	0.0049	12	4.1	36.7	525	36	5.20	12.6
5.1	Pecos	Wm Field	1,320	3.00	3.00	0.0040	5	5.1	15.3	242	24	4.87	4.5
5.1	Pecos	Wm Field	1,320	2.96	5.96	0.0040	8	4.7	28.0	443	30	5.71	8.4
5	Crismon	Ellsworth	1,320	3.27	70.26	0.0045	42	1.9	133.5	1990	60	6.80	42.3
5	Crismon	Ellsworth	1,320	3.00	73.26	0.0045	45	1.8	131.9	1966	60	6.72	45.6
5	Crismon	Ellsworth	1,320	3.00	76.26	0.0045	48	1.8	137.3	2046	60	6.99	48.7
5	Crismon	Ellsworth	1,320	3.27	79.53	0.0045	51	1.6	127.2	1897	60	6.48	52.1

Outlet to Ellsworth Road Channel
Rainfall Intensity-Duration-Frequency Relation from Figure 6-3, City of Mesa Procedure Manual.
Pipe shall be circular R.C.P. with n = 0.013. Velocity and travel time computed assuming pipe flowing full.

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10-Year Peak Runoff and Proposed Storm Drain System

Line 6

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr)	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
6.10	Warner	Ray	1,320	3.00	3.00	0.0051	5	5.1	15.3	214	24	4.87	4.5
6.10	Warner	Ray	1,320	3.00	6.00	0.0051	8	4.7	28.2	395	30	5.74	8.3
6.10	Warner	Ray	1,320	2.96	8.96	0.0051	12	4.1	36.7	514	36	5.20	12.6
6.9	Wm Field	Ray	1,320	2.96	2.96	0.0040	5	5.1	15.1	239	24	4.81	4.6
6	Meridian	Signal Bu	1,320	3.42	15.34	0.0053	16	3.6	55.2	759	42	5.74	16.4
6	Meridian	Signal Bu	1,320	3.00	18.34	0.0053	20	3.2	58.7	806	42	6.10	20.0
6	Meridian	Signal Bu	1,320	3.00	21.34	0.0053	23	3.0	64.0	879	42	6.65	23.3
6	Meridian	Signal Bu	1,320	3.27	24.61	0.0053	26	2.8	68.9	947	42	7.16	26.4
Outlet to Powerline Floodway													
6.8	Warner	Ray	1,320	3.00	3.00	0.0061	5	5.1	15.3	196	24	4.87	4.5
6.8	Warner	Ray	1,320	3.00	6.00	0.0061	8	4.7	28.2	361	30	5.74	8.3
6.8	Warner	Ray	1,320	2.96	8.96	0.0061	12	4.1	36.7	470	36	5.20	12.6
6.7	Wm Field	Ray	1,320	2.96	2.96	0.0059	5	5.1	15.1	197	24	4.81	4.6
Outlet to Powerline Floodway													
6.6	Warner	Ray	1,320	3.00	3.00	0.0061	5	5.1	15.3	196	24	4.87	4.5
6.6	Warner	Ray	1,320	2.96	5.96	0.0061	8	4.7	28.0	359	30	5.71	8.4
6.5	Wm Field	Ray	1,320	2.96	2.96	0.0059	5	5.1	15.1	197	24	4.81	4.6
Outlet to Powerline Floodway													

City of Mesa
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Line 6 (cont.)

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr)	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
6.4	Warner	Ray	1,320	3.00	3.00	0.0063	5	5.1	15.3	193	24	4.87	4.5
6.4	Warner	Ray	1,320	2.96	5.96	0.0063	8	4.7	28.0	353	30	5.71	8.4
Outlet to Powerline Floodway													
6.3	Warner	Ray	1,320	3.00	3.00	0.0040	5	5.1	15.3	242	24	4.87	4.5
6.3	Warner	Ray	1,320	2.96	5.96	0.0040	8	4.7	28.0	443	30	5.71	8.4
Outlet to Powerline Floodway													
6.2	Warner	Ray	1,320	2.78	2.78	0.0040	5	5.1	14.2	224	24	4.51	4.9
6.2	Warner	Ray	1,320	2.79	5.57	0.0040	9	4.6	25.6	405	30	5.22	9.1
6.1	Pecos	Wm Field	1,320	2.79	2.79	0.0040	5	5.1	14.2	225	24	4.53	4.9
6.1	Pecos	Wm Field	1,320	2.78	5.57	0.0040	9	4.6	25.6	405	30	5.22	9.1
6.1	Pecos	Wm Field	1,320	2.78	8.35	0.0040	13	3.9	32.6	515	36	4.61	13.8
6.1	Pecos	Wm Field	1,320	2.79	11.14	0.0040	17	3.5	39.0	616	36	5.52	17.8
6.1	Wm Field	Ray	1,320	2.79	13.93	0.0040	22	3.1	43.2	683	42	4.49	22.7
6.1	Wm Field	Ray	1,320	2.78	16.71	0.0040	27	2.8	46.8	740	42	4.86	27.3
6.1	Wm Field	Ray	1,320	2.78	19.49	0.0040	31	2.5	48.7	770	42	5.06	31.6
6.1	Wm Field	Ray	1,320	2.79	22.28	0.0040	35	2.3	51.2	810	42	5.33	35.7
Outlet to Powerline Floodway													

Rainfall Intensity-Duration-Frequency Relation from Figure 6-3, City of Mesa Procedure Manual.
Pipe shall be circular R.C.P. with n = 0.013. Velocity and travel time computed assuming pipe flowing full.

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Line 7

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr)	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
7	Santan Fwy.	Hawes	1,320	3.27	3.27	0.0040	5	5.1	16.7	264	24	5.31	4.1
7	Santan Fwy.	Hawes	1,320	3.27	6.54	0.0040	9	4.6	30.1	476	36	4.26	9.3
7.3	Ray	Warner	1,320	3.00	3.00	0.0040	5	5.1	15.3	242	24	4.87	4.5
7.3	Ray	Warner	1,320	2.96	5.96	0.0040	10	4.4	26.2	415	36	3.71	10.4
7.4	Elliot	Warner	1,320	3.00	3.00	0.0063	5	5.1	15.3	193	24	4.87	4.5
7.4	Elliot	Warner	1,320	2.96	5.96	0.0063	8	4.7	28.0	353	30	5.71	8.4
7	Hawes	Sossaman	1,320	3.27	21.73	0.0040	11	4.2	91.3	1443	48	7.26	11.4
7	Hawes	Sossaman	1,320	3.00	24.73	0.0040	15	3.7	91.5	1447	54	5.75	15.2
7	Hawes	Sossaman	1,320	3.00	27.73	0.0040	19	3.3	91.5	1447	54	5.75	19.0
7	Hawes	Sossaman	1,320	3.27	31.00	0.0040	22	3.1	96.1	1519	54	6.04	22.7
7.1	Ray	Warner	1,320	2.78	2.78	0.0040	5	5.1	14.2	224	24	4.51	4.9
7.1	Ray	Warner	1,320	2.79	5.57	0.0040	9	4.6	25.6	405	30	5.22	9.1
7.2	Elliot	Warner	1,320	2.78	2.78	0.0040	5	5.1	14.2	224	24	4.51	4.9
7.2	Elliot	Warner	1,320	2.79	5.57	0.0040	9	4.6	25.6	405	30	5.22	9.1
7	Sossaman	Power	1,320	3.27	45.41	0.0047	25	2.8	127.1	1855	54	7.99	25.4
7	Sossaman	Power	1,320	3.00	48.41	0.0047	28	2.7	130.7	1907	54	8.22	28.1
7	Sossaman	Power	1,320	3.00	51.41	0.0047	31	2.5	128.5	1875	54	8.08	30.8
7	Sossaman	Power	1,320	3.42	54.83	0.0047	33	2.4	131.6	1919	54	8.27	33.5

Outlet to East Maricopa Floodway

Rainfall Intensity-Duration-Frequency Relation from Figure 6-3, City of Mesa Procedure Manual.
Pipe shall be circular R.C.P. with n = 0.013. Velocity and travel time computed assuming pipe flowing full.

City of Mesa
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10-Year Peak Runoff and Proposed Storm Drain System

Line 8

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr)	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
8.8	Elliot	Warner	1,320	3.00	3.00	0.0040	5	5.1	15.3	242	24	4.87	4.5
8.8	Elliot	Warner	1,320	3.00	6.00	0.0040	8	4.7	28.2	446	30	5.74	8.3
8.8	Elliot	Warner	1,320	2.96	8.96	0.0040	12	4.1	36.7	581	36	5.20	12.6
8.7	Ray	Warner	1,320	2.96	2.96	0.0040	12	4.1	12.1	192	24	3.86	5.7
8	Meridian	Signal Bu	1,320	3.42	15.34	0.0046	16	3.6	55.2	814	42	5.74	16.4
8	Meridian	Signal Bu	1,320	3.00	18.34	0.0046	19	3.3	60.5	892	42	6.29	19.9
8	Meridian	Signal Bu	1,320	3.00	21.34	0.0046	24	2.9	61.9	912	48	4.92	24.4
8	Meridian	Signal Bu	1,320	3.27	24.61	0.0046	28	2.7	66.4	980	48	5.29	28.5
8.6	Elliot	Warner	1,320	3.00	3.00	0.0048	5	5.1	15.3	221	24	4.87	4.5
8.6	Elliot	Warner	1,320	2.96	5.96	0.0048	8	4.7	28.0	404	30	5.71	8.4
8.5	Ray	Warner	1,320	2.96	2.96	0.0040	8	4.7	13.9	220	30	2.83	7.8
8	Signal Bu	Crismon	1,320	3.27	36.80	0.0070	31	2.5	92.0	1100	48	7.32	31.5
8	Signal Bu	Crismon	1,320	3.00	39.80	0.0070	34	2.3	91.5	1094	48	7.28	34.6
8	Signal Bu	Crismon	1,320	3.00	42.80	0.0070	37	2.2	94.2	1125	48	7.49	37.5
8	Signal Bu	Crismon	1,320	3.27	46.07	0.0070	40	2.0	92.1	1101	48	7.33	40.5
8.4	Elliot	Warner	1,320	3.00	3.00	0.0048	5	5.1	15.3	221	24	4.87	4.5
8.4	Elliot	Warner	1,320	2.96	5.96	0.0048	8	4.7	28.0	404	30	5.71	8.4
8.3	Ray	Warner	1,320	3.00	3.00	0.0040	5	5.1	15.3	242	24	4.87	4.5
8.3	Ray	Warner	1,320	2.96	5.96	0.0040	8	4.7	28.0	443	30	5.71	8.4
8	Crismon	Ellsworth	1,320	3.27	61.26	0.0055	43	1.9	116.4	1569	54	7.32	43.5
8	Crismon	Ellsworth	1,320	3.00	64.26	0.0055	46	1.8	115.7	1560	54	7.27	46.5
8	Crismon	Ellsworth	1,320	3.00	67.26	0.0055	49	1.8	121.1	1632	54	7.61	49.4
8	Crismon	Ellsworth	1,320	3.27	70.53	0.0055	52	1.8	127.0	1712	54	7.98	52.2

Outlet to Ellsworth Channel

Rainfall Intensity-Duration-Frequency Relation from Figure 6-3, City of Mesa Procedure Manual.
Pipe shall be circular R.C.P. with n = 0.013. Velocity and travel time computed assuming pipe flowing full.

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Line 9

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr).	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
9	Santan Fwy.	Hawes	1,320	3.27	3.27	0.0057	5	5.1	16.7	221	24	5.31	4.1
9	Santan Fwy.	Hawes	1,320	3.27	6.54	0.0057	8	4.7	30.7	407	30	6.26	7.7
9.4	Ray	Warner	1,320	2.96	2.96	0.0040	5	5.1	15.1	239	24	4.81	4.6
9.4	Ray	Warner	1,320	3.00	5.96	0.0040	8	4.7	28.0	443	30	5.71	8.4
9.4	Ray	Warner	1,320	3.00	8.96	0.0040	11	4.2	37.6	595	36	5.32	12.6
9.4	Ray	Warner	1,320	2.96	11.92	0.0040	15	3.7	44.1	697	42	4.58	17.4
9.3	Elliot	Warner	1,320	3.00	3.00	0.0040	5	5.1	15.3	242	24	4.87	4.5
9.3	Elliot	Warner	1,320	2.96	5.96	0.0040	8	4.7	28.0	443	30	5.71	8.4
9	Hawes	Sossaman	1,320	3.27	27.69	0.0040	11	4.2	116.3	1839	54	7.31	11.4
9	Hawes	Sossaman	1,320	3.00	30.69	0.0040	14	3.8	116.6	1844	54	7.33	14.4
9	Hawes	Sossaman	1,320	3.00	33.69	0.0040	17	3.5	117.9	1864	54	7.41	17.3
9	Hawes	Sossaman	1,320	3.27	36.96	0.0040	20	3.2	118.3	1870	54	7.44	20.3
9.2	Ray	Warner	1,320	2.79	2.79	0.0040	5	5.1	14.2	225	24	4.53	4.9
9.2	Ray	Warner	1,320	2.78	5.57	0.0040	8	4.7	26.2	414	30	5.33	9.0
9.2	Ray	Warner	1,320	2.78	8.35	0.0040	11	4.2	35.1	555	36	4.96	13.4
9.2	Ray	Warner	1,320	2.79	11.14	0.0040	15	3.7	41.2	652	42	4.28	18.6
9.1	Elliot	Warner	1,320	2.78	2.78	0.0040	5	5.1	14.2	224	24	4.51	4.9
9.1	Elliot	Warner	1,320	2.79	5.57	0.0040	9	4.6	25.6	405	30	5.22	9.1
9	Sossaman	Power	1,320	3.27	56.94	0.0047	23	3.0	170.8	2492	60	8.70	22.8
9	Sossaman	Power	1,320	3.00	59.94	0.0047	25	2.8	167.8	2448	60	8.55	25.4
9	Sossaman	Power	1,320	3.00	62.94	0.0047	28	2.7	169.9	2479	60	8.65	28.0
9	Sossaman	Power	1,320	3.42	66.36	0.0047	30	2.5	165.9	2420	60	8.45	30.6

Outlet to East Maricopa Floodway

Rainfall Intensity-Duration-Frequency Relation from Figure 6-3, City of Mesa Procedure Manual.
Pipe shall be circular R.C.P. with n = 0.013. Velocity and travel time computed assuming pipe flowing full.

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Line 10

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr)	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
10.8	Baseline	Guadalupe	1,320	3.27	3.27	0.0059	5	5.1	16.7	217	24	5.31	4.1
10.8	Baseline	Guadalupe	1,320	3.00	6.27	0.0059	7	4.9	30.7	400	30	6.26	7.7
10.8	Baseline	Guadalupe	1,320	3.00	9.27	0.0059	11	4.2	38.9	507	36	5.51	11.7
10.8	Baseline	Guadalupe	1,320	3.27	12.54	0.0059	14	3.8	47.7	620	36	6.74	14.9
10.8	Guadalupe	Elliot	1,320	3.27	15.81	0.0040	18	3.4	53.8	850	42	5.59	18.9
10.8	Guadalupe	Elliot	1,320	3.00	18.81	0.0040	22	3.1	58.3	922	42	6.06	22.5
10.8	Guadalupe	Elliot	1,320	3.00	21.81	0.0040	26	2.8	61.1	966	42	6.35	26.0
10.8	Guadalupe	Elliot	1,320	3.27	25.08	0.0040	29	2.6	65.2	1031	42	6.78	29.2
10.7	Warner	Elliot	1,320	3.27	3.27	0.0040	7	4.9	16.0	253	30	3.26	6.7
10	Meridian	Signal Bu	1,320	3.42	31.77	0.0061	32	2.4	76.2	976	42	7.93	32.0
10	Meridian	Signal Bu	1,320	3.00	34.77	0.0061	35	2.3	80.0	1024	48	6.36	35.4
10	Meridian	Signal Bu	1,320	3.00	37.77	0.0061	38	2.1	79.3	1016	48	6.31	38.9
10	Meridian	Signal Bu	1,320	3.27	41.04	0.0061	42	1.9	78.0	998	48	6.21	42.5
10.6.2	US 60	Baseline	1,320	3.00	3.00	0.0040	5	5.1	15.3	242	24	4.87	4.5
10.6.2	US 60	Baseline	1,320	2.99	5.99	0.0040	8	4.7	28.2	445	30	5.74	8.4
10.6.2	Meridian	Signal Bu	1,320	3.42	9.41	0.0040	12	4.1	38.6	610	36	5.46	12.4
10.6.2	Meridian	Signal Bu	1,320	3.00	12.41	0.0040	17	3.5	43.4	687	42	4.51	17.3
10.6.2	Meridian	Signal Bu	1,320	3.00	15.41	0.0040	21	3.1	47.8	755	42	4.97	21.7
10.6.2	Meridian	Signal Bu	1,320	3.27	18.68	0.0040	25	2.8	52.3	827	42	5.44	25.7
10.6	US 60	Baseline	1,320	3.00	3.00	0.0040	5	5.1	15.3	242	24	4.87	4.5
10.6	US 60	Baseline	1,320	3.27	6.27	0.0040	8	4.7	29.5	466	30	6.00	8.2
10.6	Baseline	Guadalupe	1,320	3.27	28.22	0.0040	28	2.7	76.2	1205	48	6.06	29.4
10.6	Baseline	Guadalupe	1,320	3.00	31.22	0.0040	33	2.4	74.9	1185	48	5.96	33.1
10.6	Baseline	Guadalupe	1,320	3.00	34.22	0.0040	36	2.3	78.7	1244	48	6.26	36.6
10.6	Baseline	Guadalupe	1,320	3.25	37.47	0.0040	39	2.0	74.9	1185	48	5.96	40.3

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Line 10 (cont.)

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr)	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
10.6.1	Meridian	Signal Bu	1,320	3.25	3.25	0.0040	5	5.1	16.6	262	24	5.28	4.2
10.6.1	Meridian	Signal Bu	1,320	3.00	6.25	0.0040	7	4.9	30.6	484	30	6.24	7.7
10.6.1	Meridian	Signal Bu	1,320	3.00	9.25	0.0040	11	4.2	38.9	614	36	5.50	11.7
10.6.1	Meridian	Signal Bu	1,320	3.27	12.52	0.0040	16	3.6	45.1	713	42	4.68	16.4
10.6	Guadalupe	Elliot	1,320	3.27	53.26	0.0040	43	1.9	101.2	1600	54	6.36	43.7
10.6	Guadalupe	Elliot	1,320	3.00	56.26	0.0040	47	1.8	101.3	1601	54	6.37	47.2
10.6	Guadalupe	Elliot	1,320	3.00	59.26	0.0040	50	1.7	100.7	1593	54	6.33	50.6
10.6	Guadalupe	Elliot	1,320	3.27	62.53	0.0040	54	1.5	93.8	1483	54	5.90	54.4
10.5	Warner	Elliot	1,320	3.00	3.00	0.0040	5	5.1	15.3	242	24	4.87	4.5
10.5	Warner	Elliot	1,320	3.27	6.27	0.0040	8	4.7	29.5	466	30	6.00	8.2
10	Signal Bu	Crismon	1,320	3.27	113.11	0.0061	57	1.4	158.4	2028	60	8.06	57.1
10	Signal Bu	Crismon	1,320	3.00	116.11	0.0061	59	1.4	162.6	2081	60	8.28	59.8
10	Signal Bu	Crismon	1,320	3.00	119.11	0.0061	62	1.3	154.8	1983	60	7.89	62.5
10	Signal Bu	Crismon	1,320	3.27	122.38	0.0061	65	1.3	159.1	2037	60	8.10	65.3
10.4.1	Signal Bu	Crismon	1,320	3.27	3.27	0.0040	5	5.1	16.7	264	24	5.31	4.1
10.4.1	Signal Bu	Crismon	1,320	3.00	6.27	0.0040	7	4.9	30.7	486	30	6.26	7.7
10.4.1	Signal Bu	Crismon	1,320	3.00	9.27	0.0040	11	4.2	38.9	616	36	5.51	11.7
10.4.1	Signal Bu	Crismon	1,320	3.27	12.54	0.0040	16	3.6	45.1	714	42	4.69	16.3
10.4	US 60	Baseline	1,320	2.80	2.80	0.0040	5	5.1	14.3	226	24	4.55	4.8
10.4	US 60	Baseline	1,320	3.27	6.07	0.0040	8	4.7	28.5	451	30	5.81	8.6
10.4	Baseline	Guadalupe	1,320	3.27	21.88	0.0040	20	3.2	70.0	1107	48	5.57	20.3
10.4	Baseline	Guadalupe	1,320	3.00	24.88	0.0040	24	2.9	72.2	1141	48	5.74	24.1
10.4	Baseline	Guadalupe	1,320	3.00	27.88	0.0040	27	2.8	78.1	1234	48	6.21	27.7
10.4	Baseline	Guadalupe	1,320	3.27	31.15	0.0040	31	2.5	77.9	1231	48	6.20	31.2

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Line 10 (cont.)

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr)	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
10.4	Guadalupe	Elliot	1,320	3.27	34.42	0.0040	34	2.3	79.2	1252	48	6.30	34.7
10.4	Guadalupe	Elliot	1,320	3.00	37.42	0.0040	38	2.2	82.3	1302	48	6.55	38.1
10.4	Guadalupe	Elliot	1,320	3.00	40.42	0.0040	41	2.0	80.8	1278	48	6.43	41.5
10.4	Guadalupe	Elliot	1,320	3.27	43.69	0.0040	44	1.9	83.0	1313	48	6.61	44.8
10.3	Warner	Elliot	1,320	3.00	3.00	0.0040	5	5.1	15.3	242	24	4.87	4.5
10.3	Warner	Elliot	1,320	3.27	6.27	0.0040	8	4.7	29.5	466	30	6.00	8.2
10.2	Guadalupe	Elliot	1,320	3.27	3.27	0.0040	5	5.1	16.7	264	24	5.31	4.1
10.2	Guadalupe	Elliot	1,320	3.00	6.27	0.0040	7	4.9	30.7	486	30	6.26	7.7
10.2	Guadalupe	Elliot	1,320	3.00	9.27	0.0040	11	4.2	38.9	616	36	5.51	11.7
10.2	Guadalupe	Elliot	1,320	3.27	12.54	0.0040	16	3.6	45.1	714	42	4.69	16.3
10.1	Warner	Elliot	1,320	3.27	3.27	0.0040	5	5.1	16.7	264	24	5.31	4.1

Outlet to Elliot Detention Basins/Channel Channel

Rainfall Intensity-Duration-Frequency Relation from Figure 6-3, City of Mesa Procedure Manual.
Pipe shall be circular R.C.P. with n = 0.013. Velocity and travel time computed assuming pipe flowing full.

City of Mesa
Southeast Arterials Drainage Study
Project No. 01-698-001
10-Year Peak Runoff and Proposed Storm Drain System

Line11

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr)	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
11.	Ellsworth	Santan Fwy.	1,320	3.27	3.27	0.0040	5	5.1	16.7	264	24	5.31	4.1
11	Ellsworth	Santan Fwy.	1,320	3.27	6.54	0.0040	8	4.7	30.7	486	30	6.26	7.7

Outlet to Santan Freeway Road Channel

Rainfall Intensity-Duration-Frequency Relation from Figure 6-3, City of Mesa Procedure Manual.

City of Mesa
Southeast Arterials Drainage Study
Project No. 01-698-001
10-Year Peak Runoff and Proposed Storm Drain System

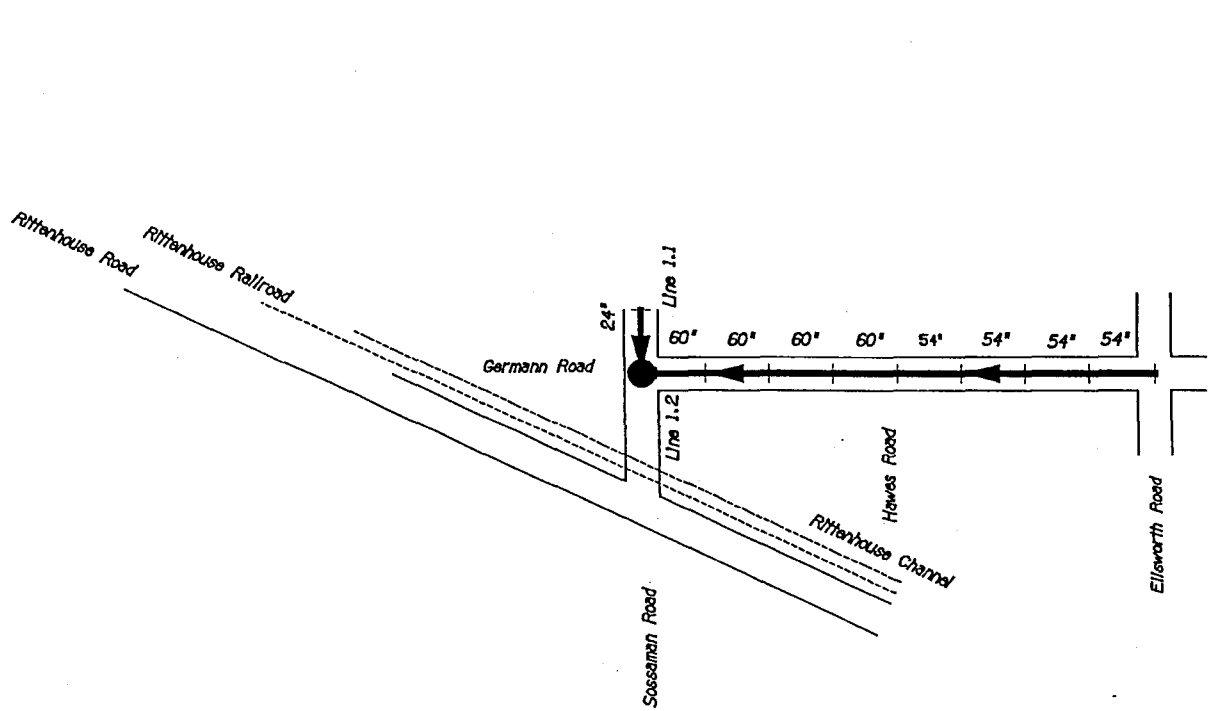
Line 12

Line	From	To	Distance (ft)	Segment CA	Total CA	Ground Slope	Assumed Tc (5 min.)	I (in/hr)	Q (cfs)	Min. K	Pipe Dia. (in.)	Velocity (fps)	Travel Time (min.)
12	Ellsworth	Santan Fwy.	1,320	3.27	3.27	0.0057	5	5.1	16.7	221	24	5.31	4.1
12	Ellsworth	Santan Fwy.	1,320	3.27	6.54	0.0057	6	5.0	32.7	433	24	10.41	6.3

Outlet to Santan Freeway Road Channel

Rainfall Intensity-Duration-Frequency Relation from Figure 6-3, City of Mesa Procedure Manual.
Pipe shall be circular R.C.P. with n = 0.013. Velocity and travel time computed assuming pipe flowing full.

Appendix C: Proposed Storm Drain Layout



Line 1

SE ARTERIALS DRAINAGE STUDY CITY OF MESA PROJECT NO. 01-698-001	FIGURE A PREMIER

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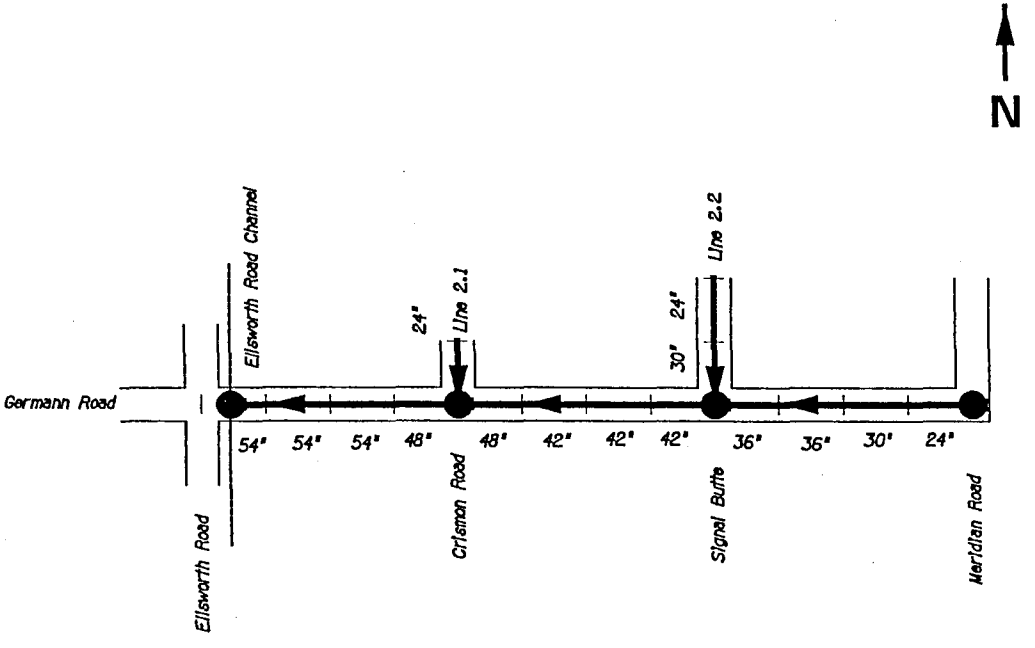

Line 2

SE ARTERIALS DRAINAGE STUDY CITY OF MESA PROJECT NO. 01-698-001	FIGURE B PREMIER

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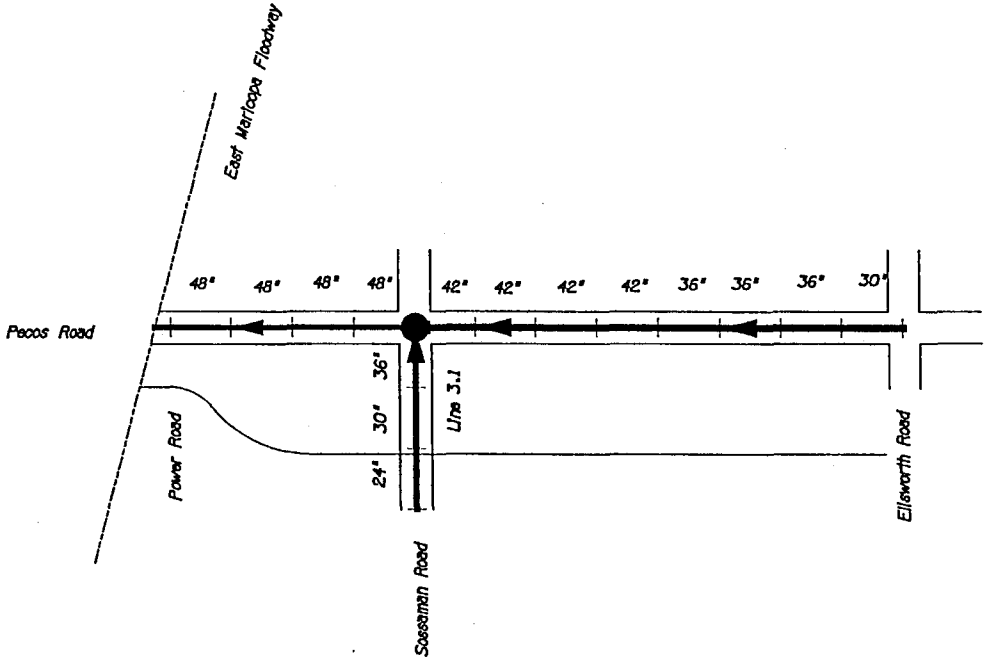
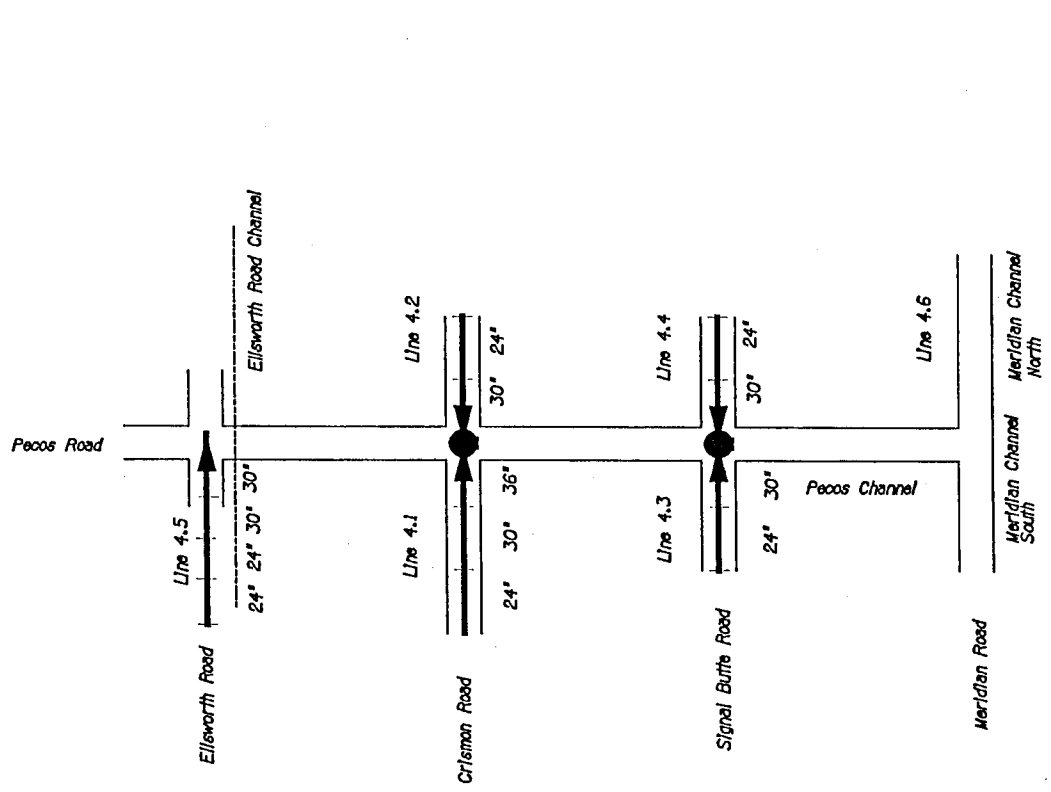


N

Line 3

SE ARTERIALS DRAINAGE STUDY CITY OF MESA PROJECT NO. 01-698-001	FIGURE C PREMIER

Plotted By: RLC1\21\2003 02:47:20 PM p:\2002027\Cadd\Civil\line 3a.dgn



Line 4

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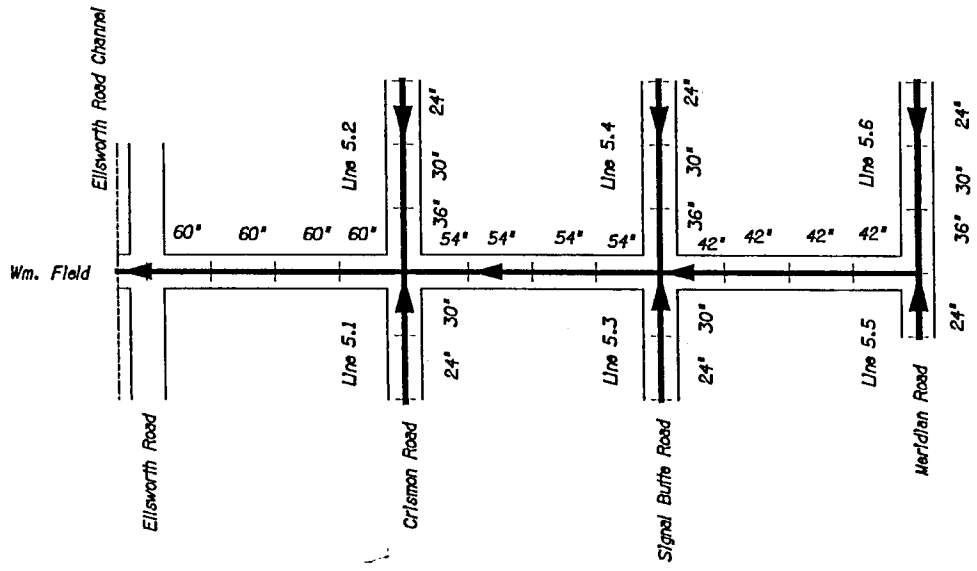

Line 5

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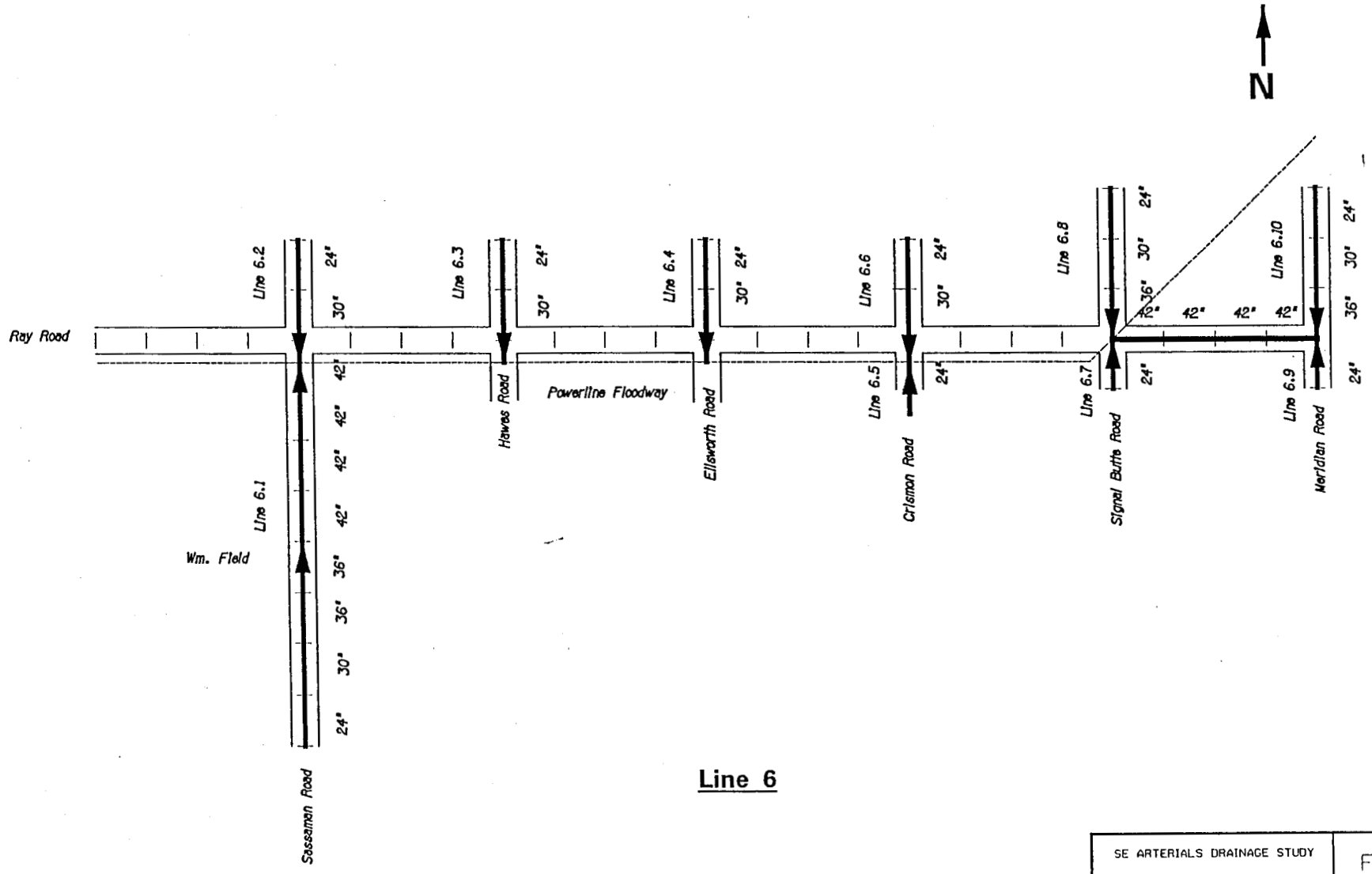

Line 6

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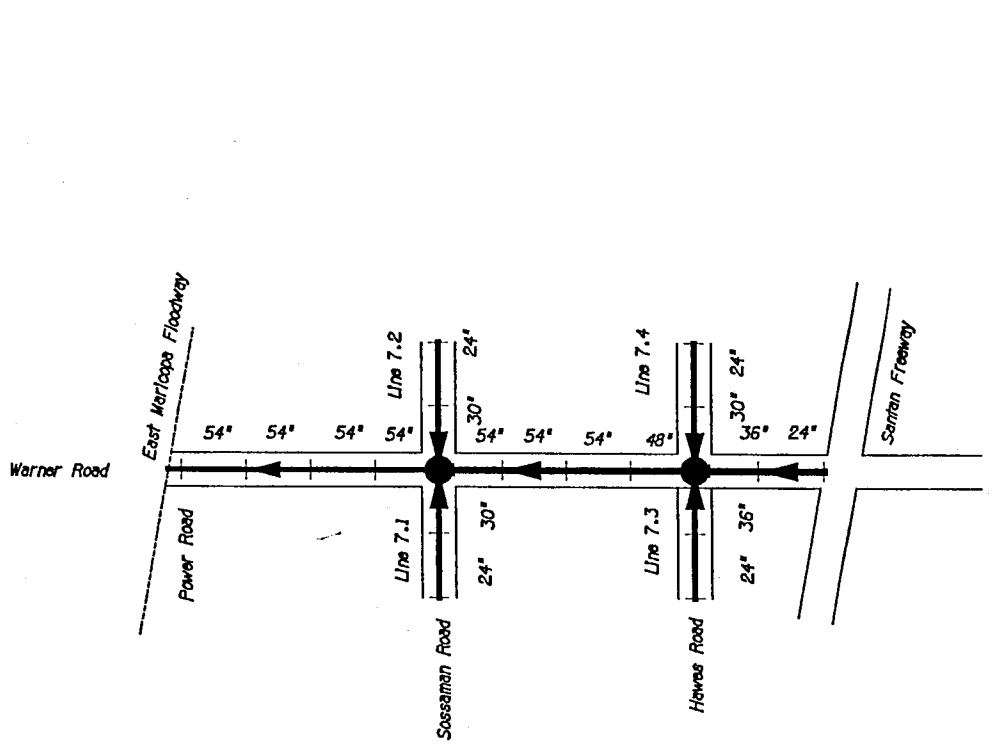

Line 7

SE ARTERIALS DRAINAGE STUDY CITY OF MESA PROJECT NO. 01-698-001	FIGURE G PREMIER

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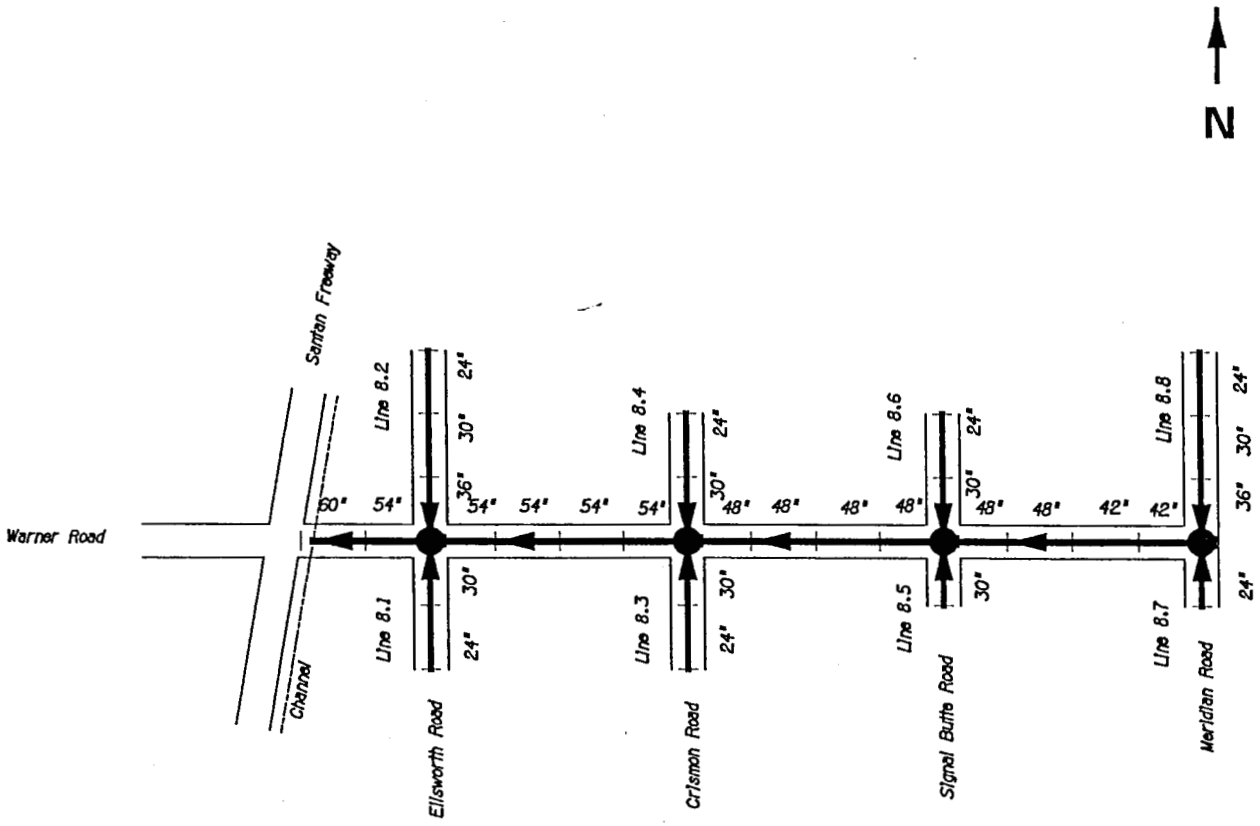
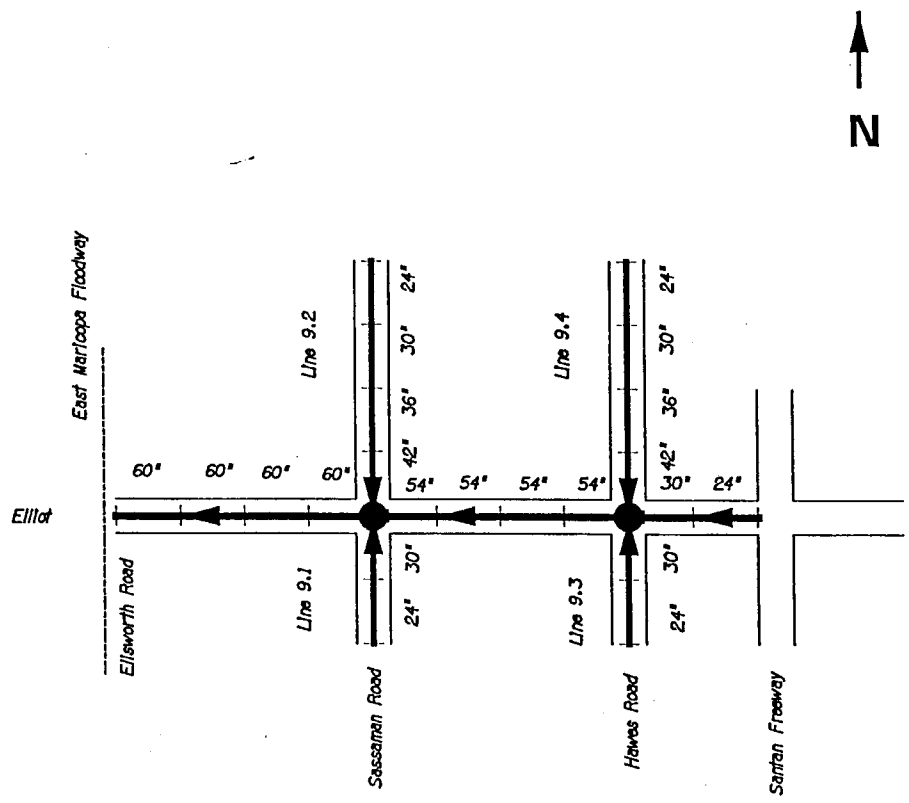


Line 8

SE ARTERIALS DRAINAGE STUDY CITY OF MESA PROJECT NO. 01-698-001	FIGURE H PREMIER

Plotted By: RLC1/21/2003 02:51:43 PM p:\2002027\Cadd\Civil\line 8a.dgn



Line 9

SE ARTERIALS DRAINAGE STUDY CITY OF MESA PROJECT NO. 01-698-001	FIGURE I PREMIER

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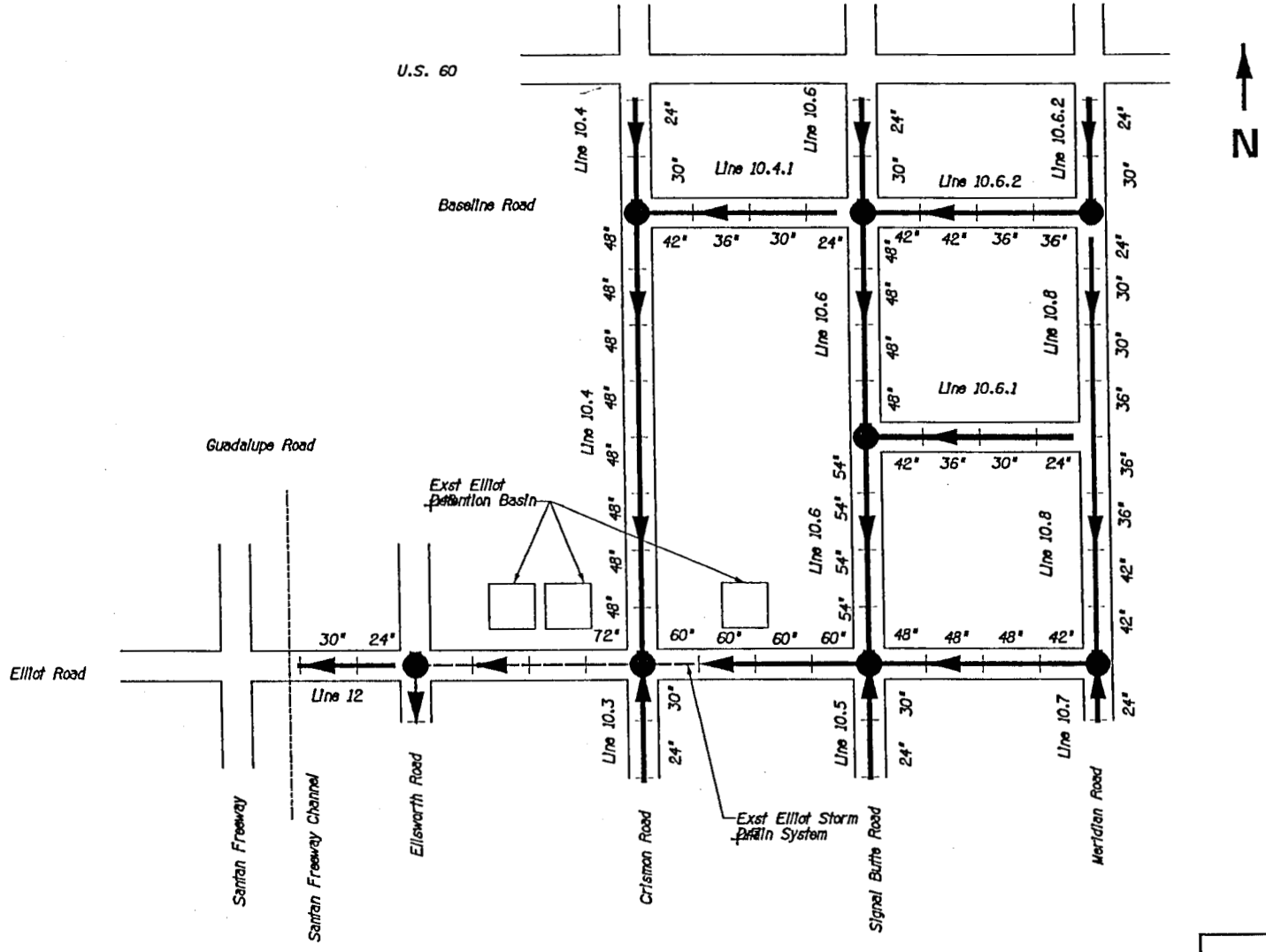


Line 10/12

SE ARTERIALS DRAINAGE STUDY

CITY OF MESA

PROJECT NO. 01-698-001

FIGURE J

PREMIER

Plotted By: RLC1/21/2003 02:52:59 PM p:\2002027\Cadd\Civil\line 10a.dgn

Appendix D: Representative Storm-main Profile

LEGEND:

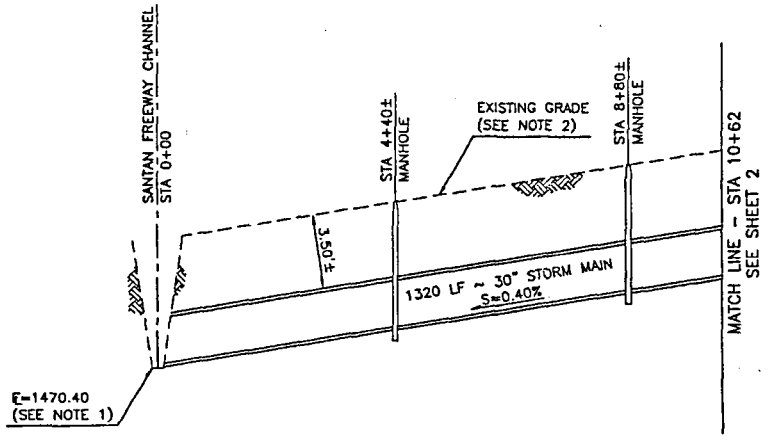
EXISTING GRADE

PROPOSED STORM MAIN

PROPOSED MANHOLE

NOTES:

1. ELEVATION AT SANTAN FREEWAY CHANNEL PER EAST MESA AREA DRAINAGE MASTER PLAN, FCD # 95-32, DATED JULY 1998.
2. THE EXISTING SLOPE OF THE NATURAL GROUND WAS ESTIMATED BASED ON INFORMATION PROVIDED FROM QUAD MAPS. ACTUAL CONDITIONS MAY VARY.
3. MANHOLES SPACED PER CITY OF MESA ENGINEERING AND DESIGN STANDARDS.
4. THIS PROFILE PREPARED FOR WARNER ROAD AS AN ILLUSTRATION OF THE PROPOSED EAST WEST ARTERIAL STREET STORM DRAIN TRUNK LINE.
5. THESE PROFILES PREPARED FOR PLANNING ONLY AND ARE NOT BASED ON ACCURATE DATA.

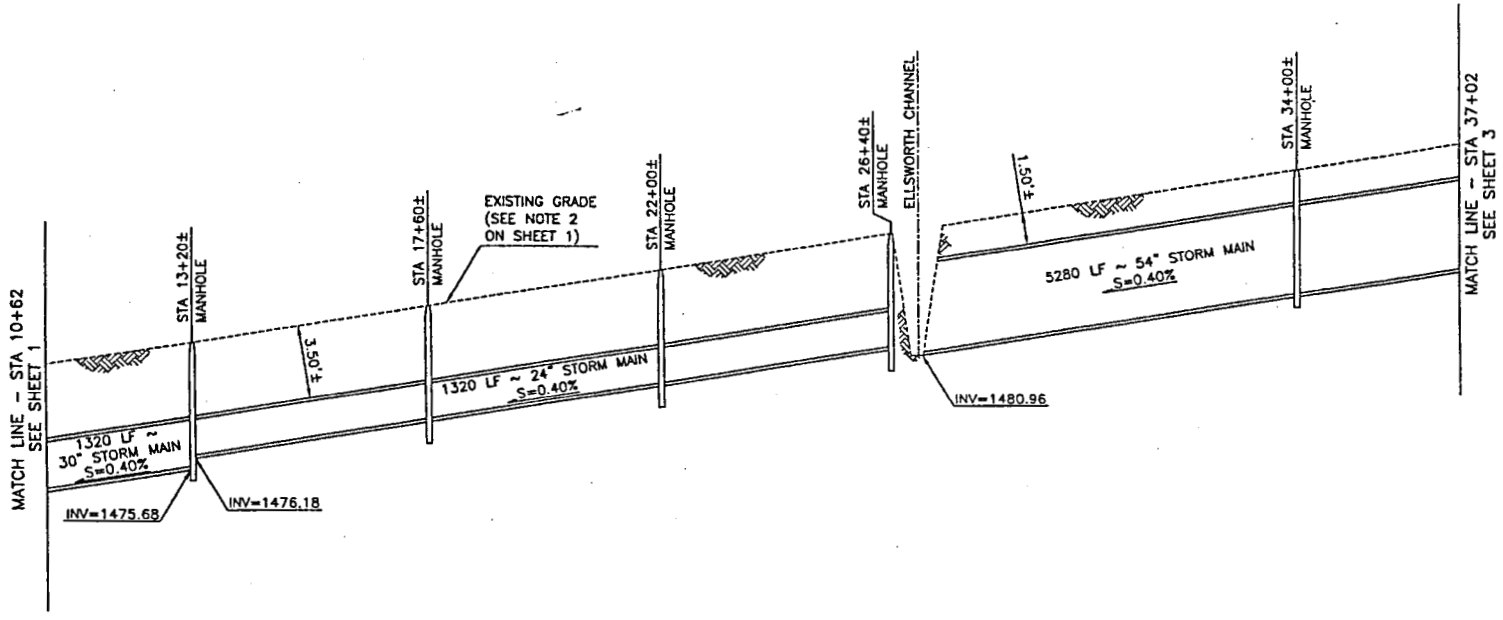


EXAMPLE STORM MAIN PROFILE OF WARNER ROAD (SANTAN FREEWAY TO MERIDIAN)

SCALE: HORIZONTAL: 1"=200' VERTICAL: 1"=5'

SHEET 1 OF 8

PREMIER

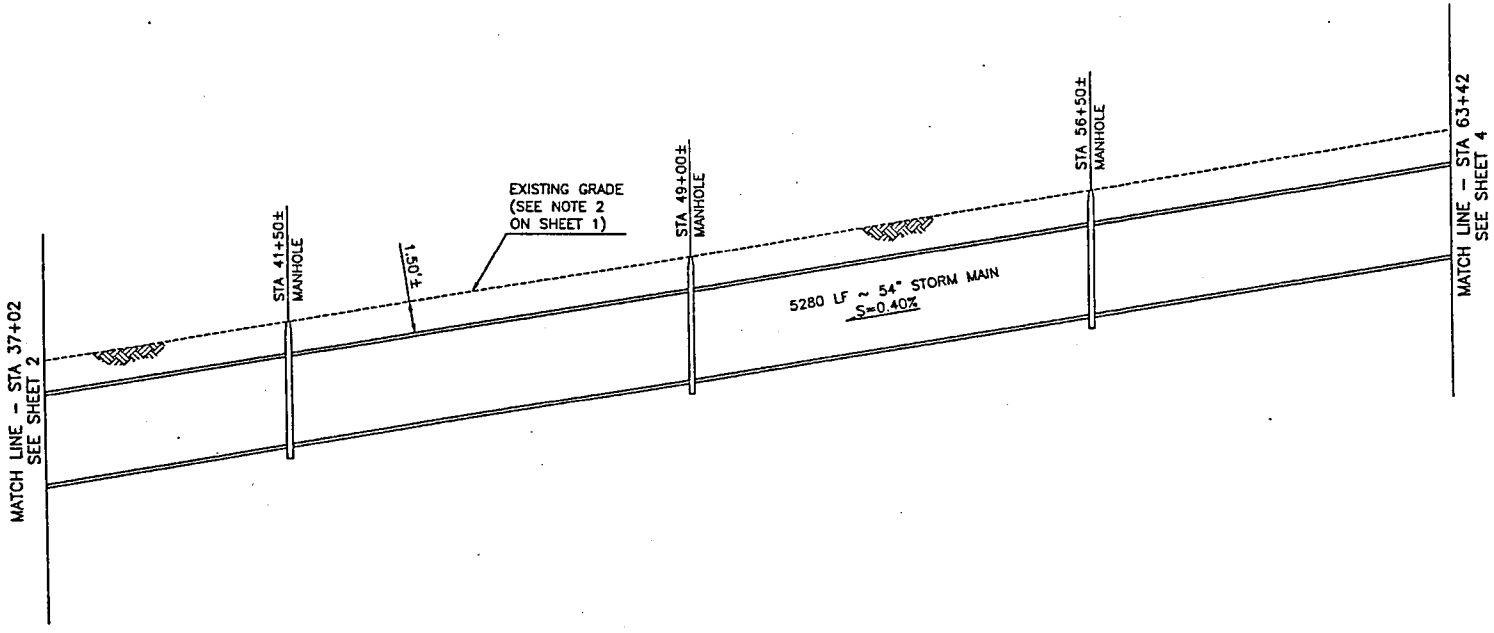


EXAMPLE STORM MAIN PROFILE
OF
WARNER ROAD
(SANTAN FREEWAY TO MERIDIAN)

SCALE: HORIZONTAL: 1"=200'
VERTICAL: 1"=5'

SHEET 2 OF 8

PREMIER

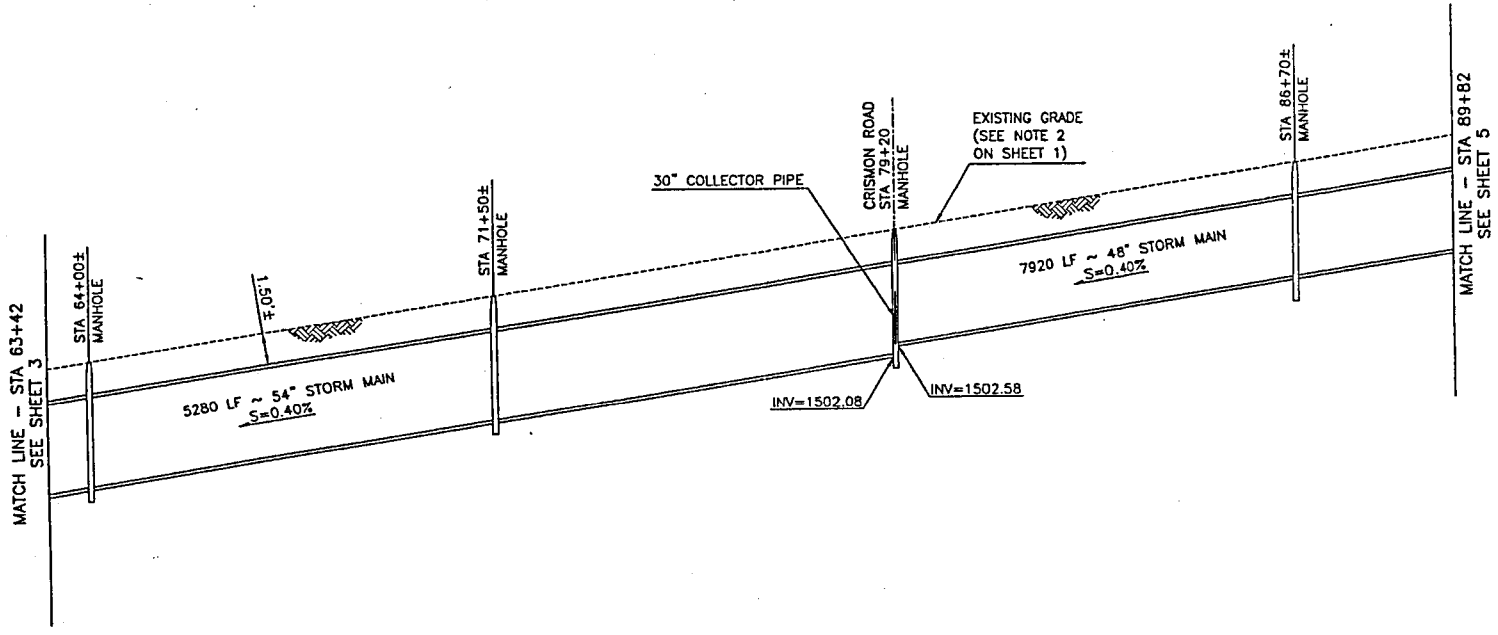


EXAMPLE STORM MAIN PROFILE
OF
WARNER ROAD
(SANTAN FREEWAY TO MERIDIAN)

SCALE HORIZONTAL: 1"=200'
VERTICAL: 1"=5'

SHEET 3 OF 8

PREMIER

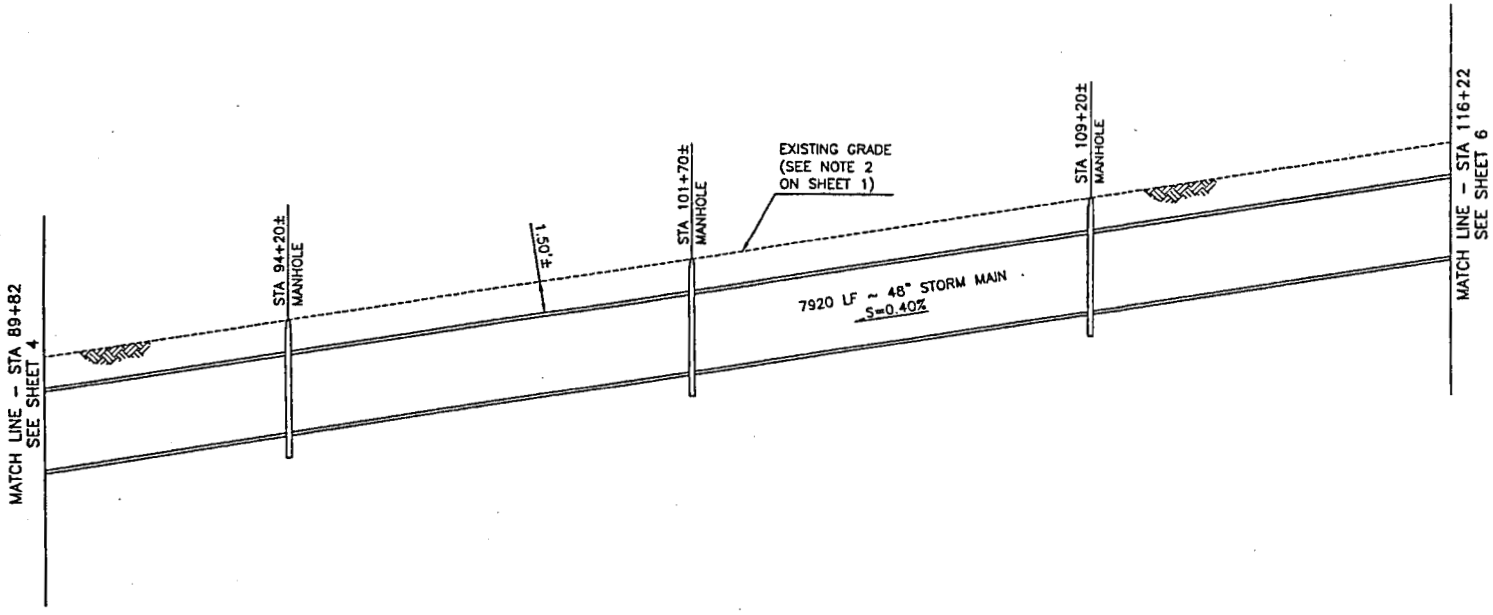


EXAMPLE STORM MAIN PROFILE
OF
WARNER ROAD
(SANTAN FREEWAY TO MERIDIAN)

SCALE: HORIZONTAL: 1"=200'
VERTICAL: 1"=5'

SHEET 4 OF 8

PREMIER

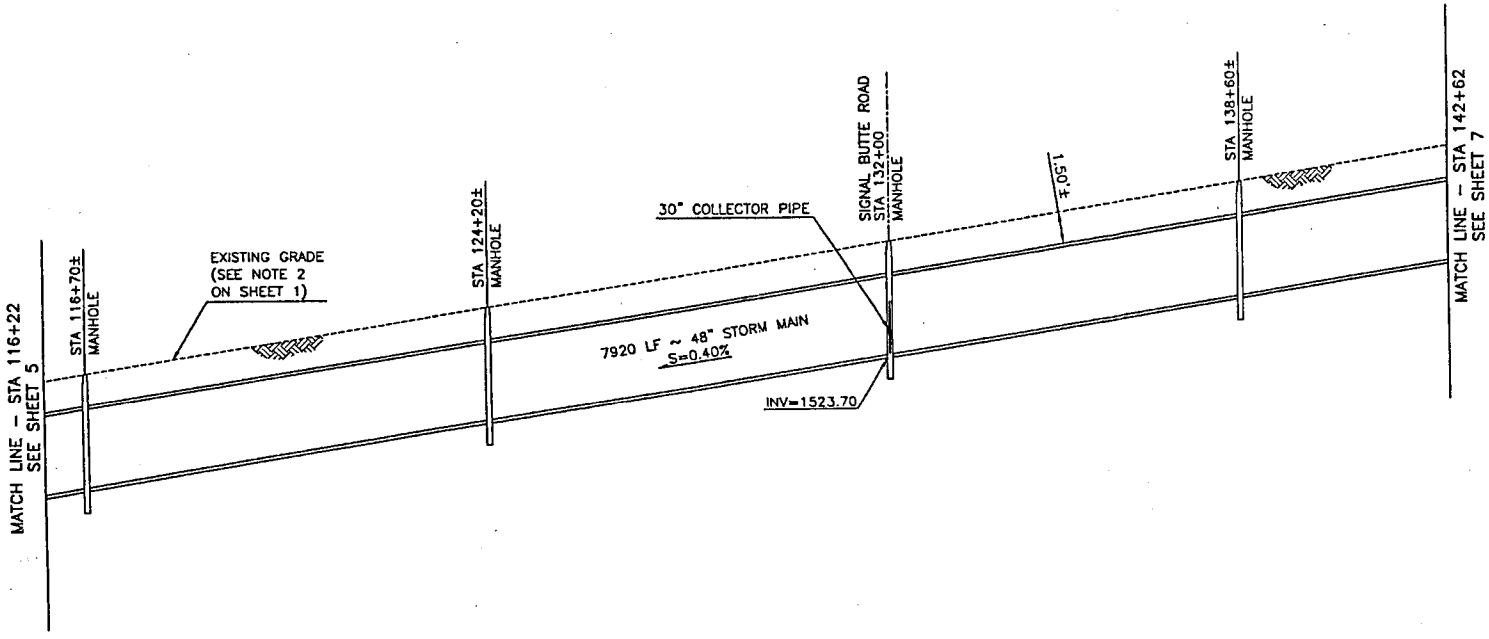


EXAMPLE STORM MAIN PROFILE
OF
WARNER ROAD
(SANTAN FREEWAY TO MERIDIAN)

SCALE: HORIZONTAL: 1"=200'
VERTICAL: 1"=5'

SHEET 5 OF 8

PREMIER

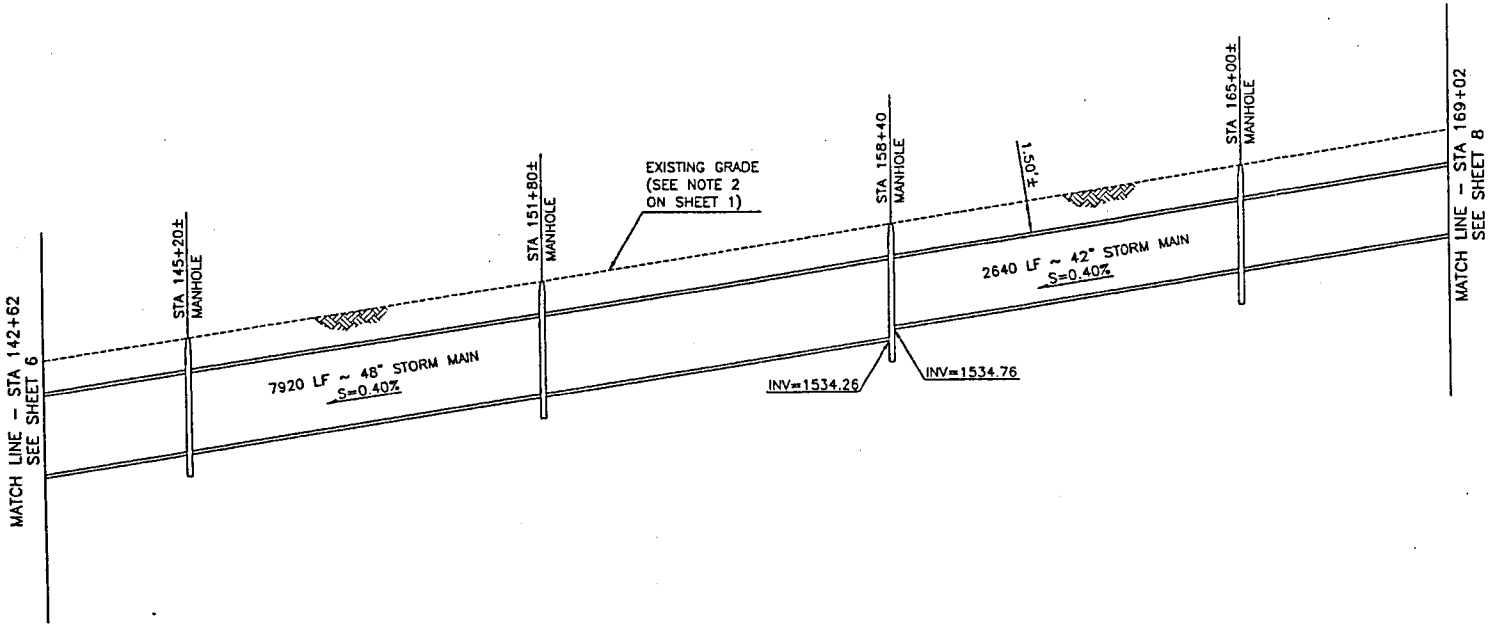


EXAMPLE STORM MAIN PROFILE
OF
WARNER ROAD
(SANTAN FREEWAY TO MERIDIAN)

SCALE: HORIZONTAL: 1"=200'
VERTICAL: 1"=5'

SHEET 6 OF 8

PREMIER

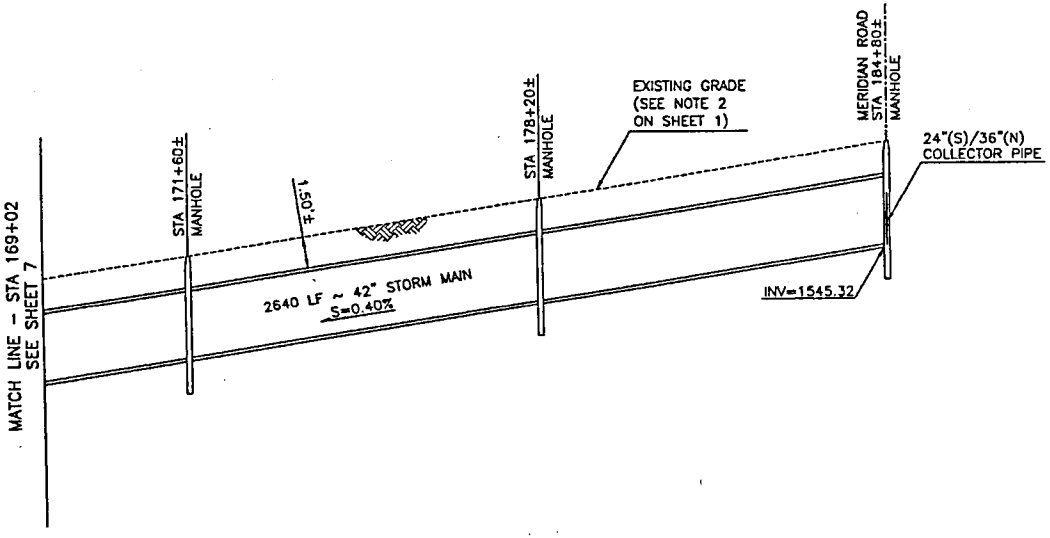


EXAMPLE STORM MAIN PROFILE
OF
WARNER ROAD
(SANTAN FREEWAY TO MERIDIAN)

SCALE: HORIZONTAL: 1"=200'
VERTICAL: 1"=5'

SHEET 7 OF 8

PREMIER



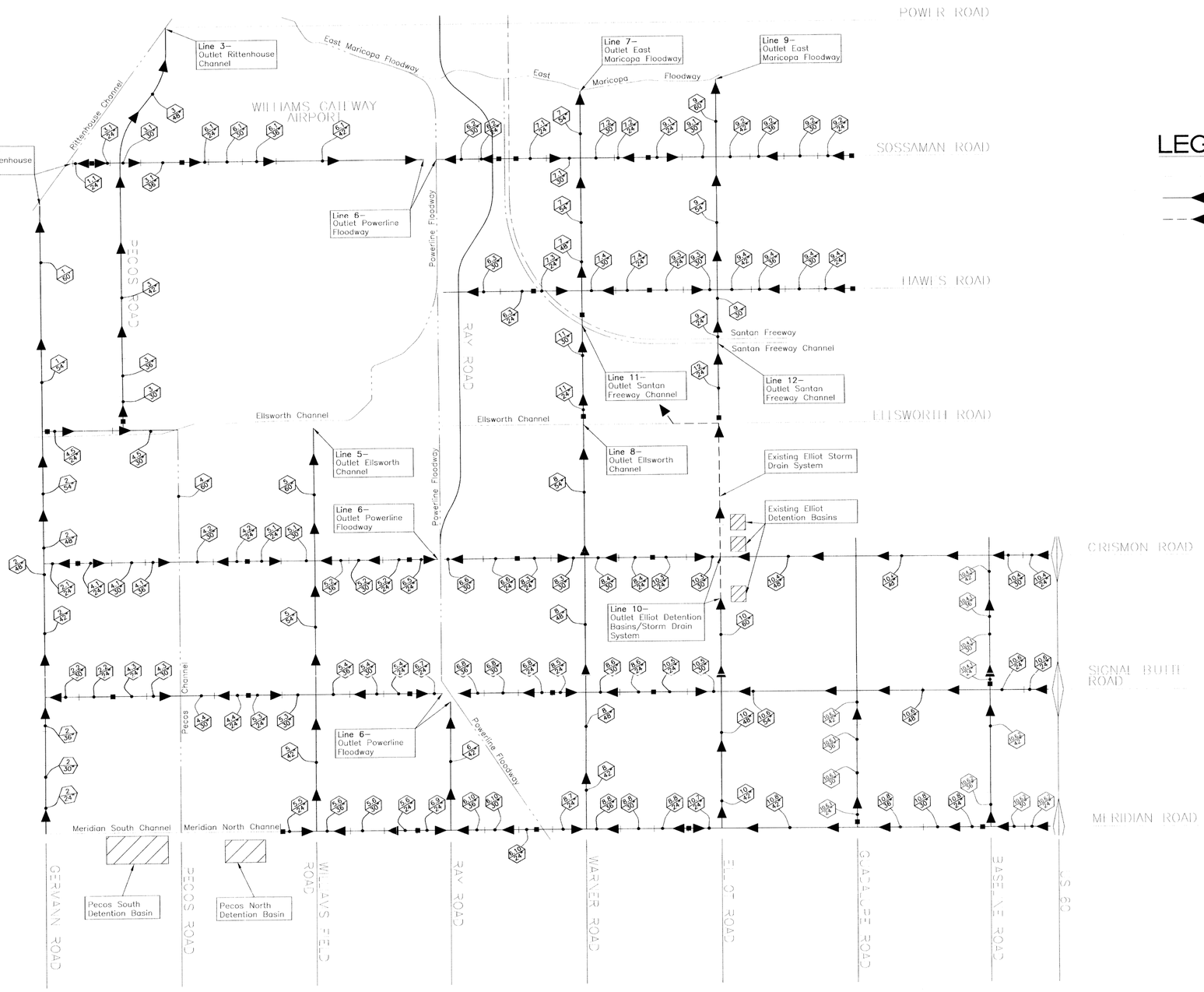
EXAMPLE STORM MAIN PROFILE
OF
WARNER ROAD
(SANTAN FREEWAY TO MERIDIAN)

SCALE: HORIZONTAL: 1"=200'
VERTICAL: 1"=5'

SHEET 8 OF 8

PREMIER

P:\2002027\Cadd\Civil\2002027PROF.dwg Tanner Nov 21, 2003 - 3:03pm



PLAN

NTS

LEGEND

- Existing/Future Floodway Channel
- Proposed Storm Main and Flow Direction
- Existing Storm Main and Flow Direction
- Line Section Indicator
- Proposed Storm Main Diameter
- Storm Drain High Point

CITY OF MESA
SE ARTERIALS DRAINAGE STUDY

PROPOSED STORM DRAIN MAINS

FIGURE 6

PREMIER

P:\2062027\Cad\Civil\StormDrainMap_Full.dwg Tavar Nov 24, 2003 – 2:46pm

Bobbie Ohler - FCDX

From: Bobbie Ohler - FCDX
Sent: Thursday, February 26, 2004 7:50 AM
To: 'tom.kmetz@cityofmesa.org'
Cc: Dave DeWeese - MCDOTX; Catherine Regester - FCDX
Subject: City of Mesa SE Arterials Drainage Study - 11-24-03 - by Premier Project No. 01-698-001

Tom - I just received a copy of the subject study, and am planning to send a copy to Dave and Cathy. The study says mistakenly shows an "Ellsworth Channel" from Elliot road south to the Powerline Floodway. You should probably let the person at Mesa in charge of this study know that there is no Ellsworth Channel there.

This study sizes a storm drain for Germann Road, for the 10-year flood.